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# Forest Pest Management

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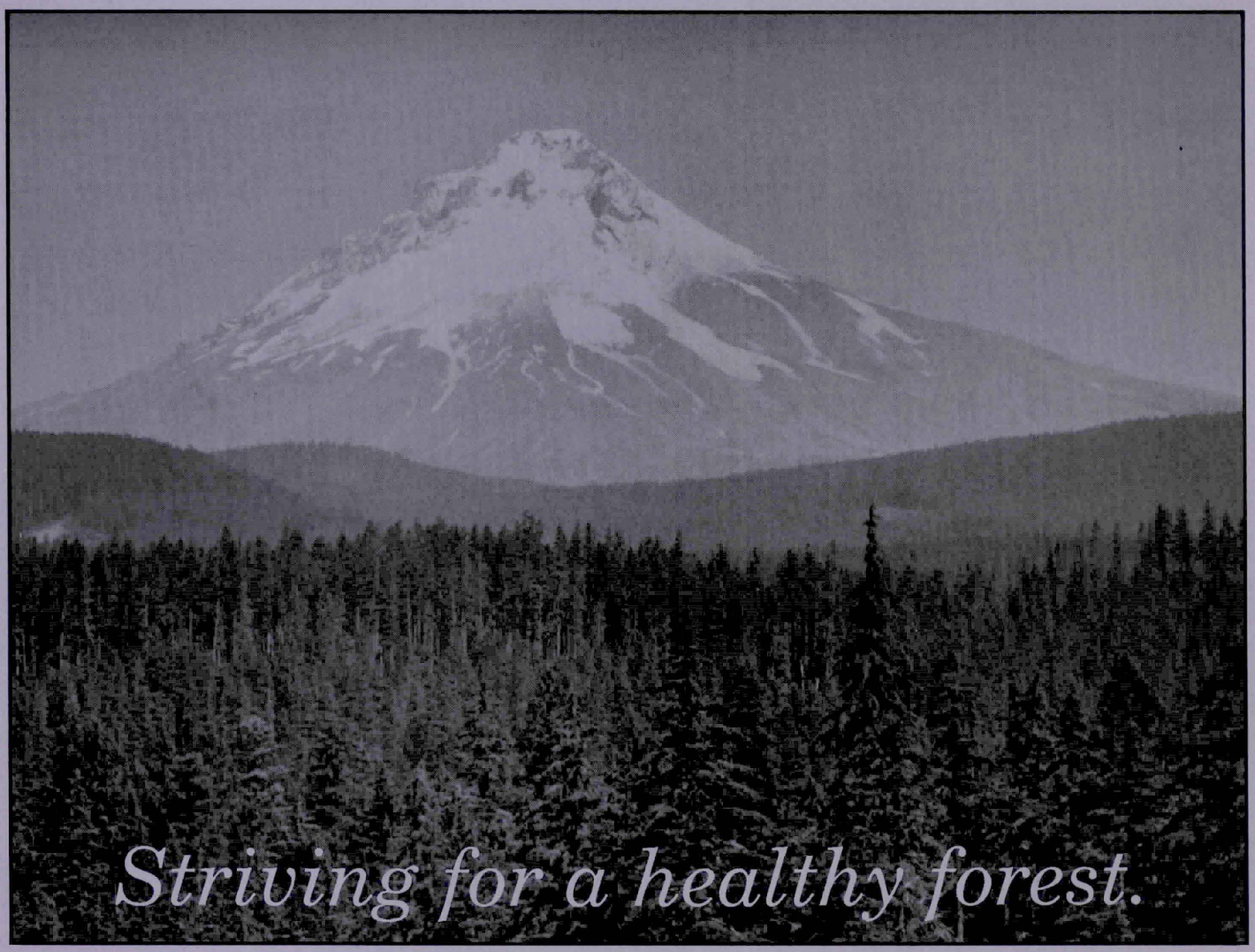
CURRENTLY REGISTERED PESTICIDES

FOR USE IN TREE NURSERIES IN

THE PACIFIC NORTHWEST



# CURRENTLY REGISTERED PESTICIDES FOR USE IN TREE NURSERIES IN THE PACIFIC NORTHWEST

by

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Forest Pest Management
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# CURRENTLY REGISTERED PESTICIDES FOR USE IN TREE NURSERIES IN THE PACIFIC NORTHWEST

IMPORTANT: All information in this report refers to **NURSERY** uses.

Legal use of pesticides depends on registration for the **SITE** or **CROP PROTECTED**. This report does not provide great detail in the lists of protected crops. **CHECK THE LABEL** to determine whether the pesticide is registered for use on a given crop.

## TABLE OF CONTENTS


page

Introduction....1

Chapter 1. Animal Repellents....2
- Putrescent Egg Solids....2
- Tetramethyl Thiuram Disulfide....2

Chapter 2. Fungicides....3
- Benomyl....3
- Bordeaux Mixture....5
- Captan....5
- Chlorothalonil....6
- Dicloran (DCNA)....9
- Dinocap....10
- Etridiazole....11
- Ferbam....12
- Fosetyl-Aluminum....12
- Lime sulfur....13
- Mancozeb....13
- Metalaxyl....16
- Propiconazole....18
- Thiophanate-methyl....18
- Thiram....19
- Triadimefon....20
- Ziram....20

Chapter 3. Herbicides....21
- Bifenox....21
- DCPA....21
- Dichlobenil....22
- EPTC....22
- Fluazifop-P-Butyl....23
- Glyphosate....24
- Lactofen....25
- Metolachlor....25
- Napropamide....26
- Oryzalin....26
- Oxadiazon....27
- Oxyfluorfen....28

Pronamide....29
Simazine....29
Sulfosate....31

Chapter 4. Insecticides....32
Acephate....32
Azinphos-methyl....32
Bacillus thuringiensis (Bt)....34
Calcium polysulfide....35
Carbaryl....35
Chlorpyrifos....36
Diazinon....37
Dicofol....38
Diflubenzuron....39
Dimethoate....39
Dinocap....40
D-phenothrin....40
Endosulfan....41
Esfenvalerate....42
Fenamiphos....43
Fenbutatin-oxide....43
Fenvalerate....44
Isofenphos....44
Lindane....45
Malathion....45
Metaldehyde....46
Methidathion....47
Methiocarb....47
Methomyl....48
Oxamyl....48
Oxydemeton-methyl....49
Permethrin....50
Propargite....51

Chapter 5. Soil Fumigants....52
Chloropicrin....52
Dazomet....52
Dichloropropene....53
Metam (Metham) Sodium....54
Methyl Bromide....55
Methyl Isothiocyanate....57

Chapter 6. Surface Treatments....58
Agribrom....58
Copper Naphthenate....58
Green-shield....59
Zinc Naphthenate....59

List of Registrants....60

Glossary of Trade Names....66

# INTRODUCTION

As part of an Integrated Nursery Pest Management program, tree growers use pesticides to reduce damage caused by insects, diseases, weeds, and other pests. Pesticides are registered by EPA (U.S. Environmental Protection Agency) and licensed for sale by the individual states. Registered pesticides can be legally used for any pest on a given crop only if:

The crop or site, such as "Forest (Nursery)" is on the label.

The label does not specifically prohibit use against the specific target pest.

All other label instructions are followed.

This publication lists pesticides currently registered for forest nursery and/or tree nursery uses in the Pacific Northwest. The word "nursery" is not repeated for each trade name listing. This report revises and replaces a March, 1988 publication by Sally Campbell, Currently Registered Fungicides and Fumigants for Use in Forest Nurseries in Oregon, Washington, and Idaho.

Registration information is derived from searches of the National Pesticide Information Retrieval System, an interactive data base maintained under contract to EPA. The search information is for summer, 1992. Technical information is derived from Farm Chemicals Handbook '92, the files of Sally Campbell, and other individuals.

A few pesticides are registered for forest nursery use only under a SLN (Special Local Needs) registration for a particular state. Some pesticides are registered only for a few specific crops, or for a long list of specific crops that is summarized for this publication. Some pesticides are not specifically labeled for a forest/tree nursery crop or site, but their use may be appropriate in some nursery situations. For example, a pesticide may be registered for "Greenhouse Soil Beds" or "Ornamentals (Nursery)" rather than "Forest (Nursery)". The applicator is required to read the label and determine the lawful application of any pesticide before use. The grower may consult the state regulatory agency for clarification; those for Oregon and Washington are listed below.

Plant Division
State Department of Agriculture
635 Capitol NE
Salem, OR 97301

Chemical and Plant Division
Department of Agriculture
Natural Resource Bldg, 1111 Washington
Olympia, WA 98504

This publication is not a management guide. We do not advocate the use of any of these products, they may or may not be effective. The amount of information for each entry varies, and some lists of trade names may not include all products that are available. Because registration status changes are frequent, the information in this publication will soon need updating.

Nevertheless, we hope that readers will find some useful information about chemical pest control options for tree nursery management.

# Chapter 1.

# ANIMAL REPELLENTS

## PUTRESCENT EGG SOLIDS

Active Ingredient: Putrescent whole egg solids

Animals repelled: Elk, deer, mountain beaver

Trade name: Deer Away Big Game Repellent BGR (1-Part) Concentrate
Registrant: Intagra, Inc.
EPA Reg. No.: 4866-8
Crops protected: Douglas-fir, noble fir, grand fir, ponderosa pine
Formulation: 15% soluble concentrate

Trade name: MGK Big Game Repellent-BGR(TM)-W
Registrant: Intagra, Inc.
EPA Reg. No.: 4866-9
Crops protected: Douglas-fir, noble fir, grand fir, ponderosa pine
Formulation: 5% solution - ready to use

Trade name: MGK Big Game Repellent Powder BGR-P
Registrant: McLaughlin Gormley King Co.
EPA Reg. No.: **SLN WA-880004 (Washington only)**, Parent EPA No. 1021-1420
Crops protected: Douglas-fir
Formulation: 36% dust

## TETRAMETHYL THIURAM DISULFIDE

Chemical name: Tetramethyl thiuram disulfide

Animals repelled: Rabbits, deer, mice

Trade name: Pratt Animal Repellent
Registrant: Southern Mill Creek Products
EPA Reg. No.: 6720-455
Crops protected: Forest trees
Formulation: 20% emulsifiable concentrate

Trade name: Science Rabbit and Deer Repellent
Registrant: Southern Mill Creek Products
EPA Reg. No.: 6720-496
Crops protected: Forest trees
Formulation: 20% flowable concentrate

## Chapter 2.

## FUNGICIDES

### BENOMYL

Chemical name: Methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate

Diseases controlled: Gray mold (Botrytis cinerea), Phomopsis blight, damping-off (Fusarium spp. and Rhizoctonia spp.), Fusarium hypocotyl and root rots, Rhizoctonia blight and rot, and others.

Trade name: Du Pont Benlate, Wettable Powder
Registrant: E. I. duPont de Nemours & Co., Inc.
EPA Reg. No.: **SLN ID-800059 (Idaho only)**, Parent EPA No. 352-354
Crops protected: Conifer nursery stock
Formulation: 50% wettable powder (50 WP)

Recommended Property Values for Benomyl

Solubility in Water (mg/L): 2

Field Half Life (days): 240

Soil Sorption Coefficient (ml/g): 1900

Vapor Pressure (mm Hg): 1 x 10 -10

General Information on Benomyl

Other trade names: Tersan

Application Methods: Foliar spray for foliage diseases.
Soil drench for soil-borne diseases.

Water Solubility and Movement in Soil: Low solubility in water. Penetration into soil is poor due to binding to soil components, especially organic matter. Because of this, soil applications are ineffective except in some situations such as with container-grown plants.

Effect of Soil pH: No effect within moderate range of pH.

Activity Period in Soil: Fairly short period. Retreatment of soil recommended at 10 to 14 day intervals.

Activity Period in Plant: A major proportion of benomyl remains intact on the surface of the plant and within the plant for several weeks after treatment. Half life is 20 days. The primary break-down product is carbendazim (MBC) which also has good fungicidal properties. Retreatment of either foliage or roots recommended at 10 to 14 day intervals.

Mode of Action: Contact and systemic. Benomyl deposited on the surface of the plant has good residual properties. A portion of it may penetrate the cuticle and stop the infection (therapeutic). It moves from the point of penetration in the water transport system to areas of greatest transpiration (e.g., leaf margins). Penetration is much greater into succulent herbacious plants than into woody tissue with a thick cuticle. Benomyl does not move downwards.

Fungistatic. Benomyl and MBC inactivate microtubule functions in fungal cell division. Because benomyl affects only one specific function in the fungus and because benzimidazole-resistant strains of fungi are present in most natural populations, exclusive use of benomyl has resulted in the predominance of resistant strains in some populations of pathogens. This problem can be avoided by use of other fungicides in rotation.

When to Use: Benlate has both preventative and therapeutic activity. It is probably best to treat before infection although due to therapeutic and systemic properties, some control might be achieved after infection has occurred. Periodic applications should be made (in rotation with other fungicides due to the buildup of resistance) during conditions favorable for disease development.

Incompatible Pesticides: Bordeaux, lime-sulfur, liquid organic coppers, Du-Ter, naptalam, dyanap, oils (although Benlate often used with oil to improve penetration through cuticle), DDT, Dinitros, Toxaphene.

Adjuvants: Adjuvants should not be used with Benlate. Some stickers inhibit uptake.

Summary: Benlate is an effective fungicide with limited systemic properties. It is best suited for treatment of above-ground disease, but in some situations (such as with container-grown crops), it can be used effectively to protect roots from soil-borne pathogens. Benlate cannot be used frequently and exclusively due to the development of resistant populations of some pathogens such as Botrytis cinerea.

## BORDEAUX MIXTURE

Chemical name: Basic copper sulfate

Diseases controlled: Bacterial canker

Trade name: Tennessee Brand Tri-Basic Coppersulfate
Registrant: Tennessee Chemical Co
EPA Reg. No.: 1109-13
Crops protected: Citrus
Formulation: 98%

## CAPTAN

Chemical name: Trichloromethylthio-4-cyclohexene-1,2-dicarboximide

Diseases controlled: Crown gall

Trade name: Captan 50 WP
Registrant: ICI Americas Inc., Agr. Prod.
EPA Reg. No.: 10182-145
Crops protected: Peaches
Formulation: 50% wettable powder

Trade name: Captan 80-WP
Registrant: ICI Americas Inc, Agr. Prod.
EPA Reg. No.: 10182-164
Crops protected: Peaches
Formulation: 80.1% wettable powder

### Recommended Property Values for Captan

Solubility in Water (mg/L): 5.1

Field Half Life (days): 2

Soil Sorption Coefficient (ml/g): 200

Vapor Pressure (mm Hg): 8 x 10 -8

## General Information on Captan

Other trade names: Orthocide, Captanex, Botec (with DCNA)

Application methods: Dip treatment.
Soil drench with incorporation-- captan sprayed onto the soil surface and then cultivated into the upper 3-4" of soil.
Furrow application, where captan applied to furrow over seed.
Foliar spray.

Water solubility and movement in soil: Low solubility in water and slow movement in soil.

Activity Period in Soil: Fairly short.

Activity Period on Plant: One to two weeks.

Mode of Action: Contact. Fungistatic. Inactivates enzyme systems of fungus. Bacteristatic?

When to Use: Use as a preventative with treatments made before infection occurs. Recommended as a pre-plant soil treatment.

Incompatible pesticides: Alkaline materials, such as spray lime, lime-sulfur, or bordeaux will reduce the fungicidal activity of captan. Do not use with solvent formulations of organic phosphates or oil. Avoid use of captan with sulfur on crops sensitive to sulfur.

Adjuvants: Use of spreaders which cause excessive wetting not advised.

Summary: Captan is an old, broad-spectrum fungicide for soil-borne and foliar pathogens.

## CHLOROTHALONIL

Chemical name: Tetrachloroisophthalonitrile

Diseases controlled: Swiss needle cast (Douglas-fir), Scleroderris canker (pines), Rhabdocline needle cast (Douglas-fir), Sirococcus tip blight, Rhizosphaera needle cast (spruce), Scirrhia brown spot (pines), Lophodermium needle cast (pines), Botrytis blight, Phoma twig blight

| | |
|---|---|
| Trade name: | Bravo W-75 Agricultural Fungicide |
| Registrant: | ISK Biotech Corp. |
| EPA Reg. No.: | 50534-23 |
| Crops protected: | Conifers, forest trees |
| Formulation: | 75% wettable powder |

| | |
|---|---|
| Trade name: | Bravo 500 |
| Registrant: | ISK Biotech Corp. |
| EPA Reg. No.: | 50534-8; |
| Crops protected: | Conifers |
| Formulation: | 40% flowable concentrate |

| | |
|---|---|
| Trade name: | Bravo 500 Agricultural Fungicide |
| Registrant: | Occidental Chemical Corporation |
| EPA Reg. No.: | **SLN OR-770060 (Oregon only)**, Parent EPA No. 677-313 |
| Crops protected: | Conifers |
| Formulation: | 40% Flowable Concentrate |

| | |
|---|---|
| Trade name: | Bravo 90DG |
| Registrant: | ISK Biotech Corp |
| EPA Reg. No.: | 50534-157 |
| Crops protected: | Conifers |
| Formulation: | 90% |

| | |
|---|---|
| Trade name: | Bravo 90DG |
| Registrant: | Platte Chemical Co |
| EPA Reg. No.: | 50534-157-3470 |
| Crops protected: | Conifers |
| Formulation: | 90% |

| | |
|---|---|
| Trade name: | Bravo Flowable Fungicide |
| Registrant: | ISK Biotech Corp |
| EPA Reg. No.: | 50534-161 |
| Crops protected: | Conifers |
| Formulation: | 40 % flowable concentrate |

| | |
|---|---|
| Trade name: | Bravo 720 |
| Registrant: | ISK Biotech Corp |
| EPA Reg. No.: | 50534-188 |
| Crops protected: | Conifers |
| Formulation: | 54 % emulsifiable concentrate |

| | |
|---|---|
| Trade name: | Bonide Turf, Garden & Ornamental Fungicide |
| Registrant: | Bonide Products, Inc |
| EPA Reg. No.: | 4-290 |
| Crops protected: | Conifers |
| Formulation: | 50% wettable powder |

| | |
|---|---|
| Trade name: | Riverside Chlorothalonil 4L |
| Registrant: | Riverside/Terra Corp |
| EPA Reg. No.: | 9779-270 |
| Crops protected: | Conifers |
| Formulation: | 40% emulsifiable concentrate |

| | |
|---|---|
| Trade name: | Chlorothalonil 90 DF |
| Registrant: | Riverside/Terra Corp |
| EPA Reg. No.: | 9779-280 |
| Crops protected: | Conifers |
| Formulation: | 90% |

| | |
|---|---|
| Trade name: | Chlorothalonil 500 |
| Registrant: | Sostram Corp |
| EPA Reg. No.: | 50534-8-60063 |
| Crops protected: | Forest and ornamental conifers |
| Formulation: | 40% flowable concentrate |

| | |
|---|---|
| Trade name: | Champ 75W |
| Registrant: | Veterans-Ilex, Inc. |
| EPA Reg. No.: | 61451-3 |
| Crops protected: | Conifers |
| Formulation: | 75% wettable powder |

| | |
|---|---|
| Trade name: | Daconil 2787 Flowable Fungicide |
| Registrant: | Occidental Chemical Corp. |
| EPA Reg. No.: | **SLN OR-770061 (Oregon only)**, Parent EPA No. 677-315 |
| Crops protected: | Conifers |
| Formulation: | 54% flowable concentrate |

| | |
|---|---|
| Trade name: | Daconil 2787 Flowable Fungicide |
| Registrant: | Occidental Chemical Corporation |
| EPA Reg. No.: | **SLN WA-770033 (Washington only)**, Parent EPA No. 677-315 |
| Crops protected: | Conifers |
| Formulation: | 54% flowable concentrate |

| | |
|---|---|
| Trade name: | Evade |
| Registrant: | Platte Chemical Co |
| EPA Reg. No.: | 61451-1-34704 |
| Crops protected: | Christmas trees, conifers |
| Formulation: | 40% flowable concentrate |

Recommended Property Values for Chlorothalonil

| | |
|---|---|
| Solubility in Water (mg/L): | 0.6 |
| Field Half Life (days): | 30 |
| Soil Sorption Coefficient (ml/g): | 1380 |
| Vapor Pressure (mm Hg): | 0.001 |

## General Information on Chlorothalonil

Application Methods: Foliar application. Drenching or incorporation into soil is not recommended except with Rhizoctonia which inhabits the soil surface and can be controlled with high volume drenching.

Water Solubility and Movement in the soil: Low solubility in water and little movement in the soil. High affinity to colloidal soil particles results in rapid binding of chlorothalonil to the soil, rendering it unavailable for fungicidal action.

Activity Period in the Soil: Little activity in the soil.

Activity Period on the Plant: Fairly long for contact foliar fungicide. Half-life is very long; not subject to UV breakdown. Retreatment recommended at 1 to 4 week intervals.

Mode of Action: Contact. Does not accumulate in plant tissues. It is highly lipophilic so that it has exceptionally long residual activity on coniferous foliage. Deposits will redistribute on plant surfaces.

Interactions between chlorothalonil and fungal cells result in loss of fungal cell viability; possibly fungicidal.

When to Use: Chlorothalonil has no therapeutic activity and so should be used as a preventative chemical, with treatments prior to infection and at regular intervals thereafter, when conditions favor disease development.

Phytotoxicity: Generally none seen on plants when treated at label rates. Two exceptions: Juniperus spp and Abies balsamea have shown leaf bronzing and/or defoliation, particularly when highly concentrated spray preparations were used.

Summary: Chlorothalonil is an effective foliar fungicide with good residual properties. It is a contact material, requiring that applications be made prior to infections.

## DICLORAN (DCNA)

Chemical name: Dichloro-4-nitroaniline

Diseases controlled: Botrytis grey mold

| | |
|---|---|
| Trade name: | Botran 75W |
| Registrant: | The Upjohn Co |
| EPA Reg. No.: | **SLN CA-800176 (California only)**, Parent EPA No. 1023-36 |
| | **SLN ID-820006 (Idaho only)**, Parent EPA No. 1023-36 |
| Crops protected: | Some conifers |
| Formulation: | 75% wettable powder |

| | |
|---|---|
| Trade name: | Botran 75W |
| Registrant: | Nor-Am Chemical Co. |
| EPA Reg. No.: | 45639-110, **SLN OR-800076 (Oregon only)** |
| Crops protected: | Conifers |
| Formulation: | 75% spray powder |

Recommended Property Values for DCNA

Solubility in Water (mg/L): 7

Field Half Life (days): 10

Soil Sorption Coefficient (ml/g): 1000

Vapor Pressure (mm Hg): 1.3 x 10 -6

## DINOCAP

Chemical name: Dinitro octyl phenyl crotonates and nitrooctyl-phenols

Diseases controlled: Powdery mildew (and mites)

| | |
|---|---|
| Trade name: | Karathane WD |
| Registrant: | Rohm and Haas Co |
| EPA Reg. No.: | 707-53 |
| Crops protected: | Apples, cherries, peaches |
| Formulation: | 19.5% wettable powder |

| | |
|---|---|
| Trade name: | Karathane LC |
| Registrant: | Rohm and Haas Co |
| EPA Reg. No.: | 707-71 |
| Crops protected: | Apples, cherries, peaches |
| Formulation: | 37.4% emulsifiable concentrate |

Recommended Property Values for Dinocap

Solubility in Water (mg/L): 4

Field Half Life (days): 10

Soil Sorption Coefficient (ml/g): 550

Vapor Pressure (mm Hg): 4 x 10 -8

## ETRIDIAZOLE

Chemical name: Ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole

Diseases controlled: Damping-off and rot caused by Pythium and Phytophthora

Trade name: Truban 30% WP
Registrant: Grace/Sierra Crop Protection Co
EPA Reg. No.: 58185-7
Crops protected: Hemlock and many ornamentals
Formulation: 30% wettable powder

Trade name: Truban EC
Registrant: Grace/Sierra Crop Protection Co.
EPA Reg. No.: 58185-8
Crops protected: Juniper, red pine, and many ornamentals
Formulation: 25% emulsifiable concentrate

Trade name: Truban 5.G
Registrant: Grace/Sierra Crop Protection Co.
EPA Reg. No.: 58185-13
Crops protected: Fir
Formulation: 5% granular

Recommended Property Values for Etridiazole

Solubility in Water (mg/l): 50

Field Half Life (days): 20

Soil Sorption Coefficient (ml/g): 1000

Vapor Pressure (mm Hg): 1 x 10 -4

## FERBAM

Chemical name: Ferric dimethyldithiocarbamate

Diseases controlled: Gray mold, cone rusts, rusts, needle cast

Trade name: Carbamate
Registrant: FMC Corporation
EPA Reg. No.: **SLN OR-820050 (Oregon only)**, Parent EPA No. 279-388
Crops protected: Conifer nurseries
Formulation: 76% Wettable powder

Trade name: Carbamate
Registrant: FMC Corporation
EPA Reg. No.: **SLN WA-770031 (Washington only)**, Parent EPA No. 279-388
Crops protected: Conifer nurseries
Formulation: 76% Soluble concentrate

Trade name: Carbamate WDG
Registrant: UCB Chemicals Corp.
EPA Reg. No.: 45728-7
Crops protected: Conifers
Formulation: 76% spray powder

Recommended Property Values for Ferbam

| | |
|---|---|
| Solubility in Water (mg/L): | 120 |
| Field Half Life (days): | 17 |
| Soil Sorption Coefficient (ml/g): | 300 |
| Vapor Pressure (mm Hg): | $< 10^{-5}$ |

## FOSETYL-ALUMINUM

Chemical name: Aluminum tris (ethyl phosphonate)

Diseases controlled: Phytophthora root rot

Trade name: Aliette Fungicide
Registrant: Rhone-Poulenc Agricultural Company
EPA Reg. No.: 264-467
Crops protected: Many ornamental and fruit trees, Monterey pine, juniper and yew

Trade name: Chipco Aliette WDG Fungicide
Registrant: Rhone-Poulenc Agricultural Company
EPA Reg. No.: 264-515
Crops protected: Juniper, yew and many ornamentals

Recommended Property Values for Fosetyl-Aluminum

Solubility in Water (mg/L): 120000

Field Half Life (days): 1

Soil Sorption Coefficient (ml/g): 20

Vapor Pressure (mm Hg): $< 10^{-7}$

## LIME SULFUR

Chemical name: Calcium polysulfide

Diseases controlled: Scab (also mites and scales)

Trade name: Cooke Sulf-R-Spray
Registrant: Cooke Laboratory Products
EPA Reg. No.: 802-73-909
Crops protected: Thuja, cedar, pine, spruce, yew, cottonwood, plum and some ornamentals
Formulation: 28.7% soluble concentrate

## MANCOZEB

Chemical name: Zinc ion and manganese ethylenebisdithiocarbamate

Diseases controlled: Needle cast, pine gall rust, Scirrhia brown spot, Swiss needle cast, Phomopsis blight, Cercospora blight, Cylindrocladium damping-off; foliar diseases, rusts, leafspots and blights, gray mold, powdery mildew

Trade name: Rockland Mancozeb Fungicide
Registrant: Rockland Corp.
EPA Reg. No.: 572-340
Crops protected: Conifers
Formulation: 75%

Trade name: Mancozeb 80WP
Registrant: Platte Chemical Co
EPA Reg. No.: 352-341-34704
Crops protected: Ash, buffaloberry, birch, mountain ash, red cedar, many ornamentals
Formulation: 80% wettable powder

Trade name: Manex II
Registrant: Griffin Corp
EPA Reg. No.: 352-398-1812
Crops protected: Almonds, crabapples, prunes
Formulation: 37% flowable concentrate

Trade name: Mancozeb 4L
Registrant: Platte Chemical Co
EPA Reg. No.: 352-398-34704
Crops protected: Almonds, crabapples, prunes; conifers
Formulation: 37% flowable concentrate

Trade name: Dithane F-45
Registrant: Rohm and Haas Co
EPA Reg. No.: 707-156
Crops protected: Ornamental conifers
Formulation: 37% flowable concentrate

Trade name: Dithane DF
Registrant: Rohn and Haas Co
EPA Reg. No.: 707-180
Crops protected: Ornamental conifers
Formulation: 75% emulsifiable concentrate

Trade name: Manzate 200DF
Registrant: E.I. DuPont Ag Products
EPA Reg. No.: 352-449
Crops protected: Many conifers, hardwoods, and ornamentals
Formulation: 75%

Trade name: Manzate 200 Flowable
Registrant: E.I. DuPont Ag Products
EPA Reg. No.: 352-398
Crops protected: Conifers
Formulation: Flowable

Trade name: Duosan or Zyban
Registrant: Grace/Sierra Crop Protection Co.
EPA Reg. No.: 58185-11
Crops protected: Dogwood, juniper, and many ornamentals
Formulation: 60% mancozeb, 15% thiophanate-methyl; 75% wettable powder

Trade name: Duosan WSB Wettable Powder
Registrant: Grace/Sierra Crop Protection Co.
EPA Reg. No.: 58185-28
Crops protected: Juniper, dogwood, and many ornamentals
Formulation: 60% mancozeb, 15% thiophanate-methyl; wettable powder

## Recommended Property Values for Mancozeb

| | |
|---|---|
| Solubility in Water (mg/L): | 6 |
| Field Half Life (days): | 70 |
| Soil Sorption Coefficient (ml/g): | 2000 |
| Vapor Pressure (mm Hg): | 0 |

## General Information on Mancozeb

Other Manufacturers: Rohm and Haas; DuPont

Other Trade names: Dithane, Manzate

Application Methods: Foliar application

Water Solubility and Movement in Soil: Relatively insoluble in water. With large volumes of water, mancozeb can be moved down into the soil 1 or 2 inches. The degradation products can leach in the soil.

Effect of Soil pH: Soil pH less than 4 will decrease the effectiveness of mancozeb.

Activity Period on Plant: Active on plant surface 21 to 30 days. Retreatment is recommended at 7 to 30 day intervals, with the shorter intervals for protection during periods when needles are rapidly elongating.

Mode of Action: Contact; fungistatic or fungicidal, depending on dosage. Mancozeb, at high dosage, will kill mycelium and spores of target fungi. At lower dosage, spore germination and vegetative growth are inhibited but not killed. Inactivation of these functions occurs by inhibition of SH enzyme.

When to Use: Mancozeb is effective as a protectant; applications should be made before infection occurs and at regular intervals when conditions favor disease development.

Incompatible Chemicals: May decompose rapidly if combined with highly acid micronutrient solutions.

Adjuvants: Use of surfactants on plants having a waxy leaf surface and a vertical growth habit, will improve performance by providing a more uniform spray deposit and increased redistribution on leaves. Some surfactants such as Triton B-1956 have sticking properties which improve foliar retention under rainy conditions.

Summary: Mancozeb is a contact foliar fungicide for control of some foliage diseases. It has a relatively short activity period with retreatment needed every 2 to 3 weeks.

## METALAXYL

Chemical name: Dimethylphenyl-N-methoxyacetyl alanine, methyl ester

Diseases controlled: Damping-off and root rot caused by Pythium and Phytophthora

| | |
|---|---|
| Trade name: | Subdue 2E |
| Registrant: | Ciba-Geigy Corporation |
| EPA Reg. No.: | 100-619 |
| Crops protected: | Conifers, fruit and nut trees, ceanothus, artemisia, dogwood, and many ornamentals |
| Formulation: | 25% emulsifiable concentrate |

| | |
|---|---|
| Trade name: | Subdue 5G |
| Registrant: | Ciba-Geigy Corporation |
| EPA Reg. No.: | 100-646 |
| Crops protected: | Forest conifers, fruit and nut trees, artemisia, ceanothus, dogwood, and many ornamentals |
| Formulation: | 5% granular |

| | |
|---|---|
| Trade name: | Subdue Granular |
| Registrant: | Ciba-Geigy Corporation |
| EPA Reg. No.: | 100-676 |
| Crops protected: | Forest conifers, fruit and nut trees |
| Formulation: | 2% granular |

### Recommended Property Values for Metalaxyl

| | |
|---|---|
| Solubility in Water (mg/L): | 8400 |
| Field Half Life (days): | 70 |
| Soil Sorption Coefficient (ml/g): | 50 |
| Vapor Pressure (mm Hg): | 5.6 x 10 -6 |

## General Information on Metalaxyl

Other Trade Names: Apron, Ridomil

Application Methods: Foliar spray with irrigation to move into the root zone; soil incorporation or side-dress

Water Solubility and Movement in the Soil: Moderately soluble in water; moves fairly well in the soil. A percentage of the material will move with the water front in the soil. Irrigation can be used to "incorporate" metalaxyl. High organic matter can bind metalaxyl.

Effect of Soil pH: Degradation is accelerated at pH above 8.5.

Activity Period in the Soil: Fairly long; the half-life is 27 to 97 days under aerobic conditions. Yearly applications do not result in accumulation in the soil. Degradation is attributed to microbial activity; repeated use will result in a build-up of these microorganisms. Loss from photo-decomposition or volatilization is negligble.

Activity Period in the Plant: Very long, up to 180 days. Retreatment recommended at 60 to 180 day intervals.

Mode of Action: Systemic and contact. Uptake occurs from the soil by roots with upwards translocation. Upward movement is gradual and continuous, providing continuous disease control for an extended period of time. Limited downwards translocation following uptake by leaves and stems.

Plant foliage can also absorb metlaxyl in the vapor phase, thus providing disease control in hot or enclosed conditions such as a greenhouse. Metalaxyl accumulates in areas of the plant where transpiration is highest, such as leaf margins.

Fungistatic; inhibits sporangia, oospore and chlamydospore formation and, to a lesser extent, mycelial growth and chlamydospore germination. RNA synthesis is inhibited via inhibition of RNA polymerase or by binding of metalaxyl to DNA, thus rendering it unsuitable as a template for RNA synthesis.

When to Use: Metalaxyl has both preventative and therapeutic activity. It is best to use prior to infection but treatment after infection has occurred will stop further fungal development in the plant.

Adjuvants: Adjuvants should not be used with metalaxyl.

Summary: Metalaxyl is a very effective systemic fungicide for control of Phycomycete fungi. It can be easily moved

through the soil with water where roots can absorb it and translocate it upwards. It has a very long activity period, with retreatments at 3 to 12 month intervals.

## PROPICONAZOLE

Chemical name: Dichlorophenyl-4-propyl-1,3-dioxolan-2-yl-1H-1,2,4 triazole

Diseases controlled: Foliar diseases caused by a broad range of fungi.

Trade name: Banner
Registrant: CIBA-GEIGY Corp.
EPA Reg. No.: 100-641
Crops protected: Some fruit and nut trees, including apple and walnut.
Formulation: 14% emulsifiable concentrate

Other Trade Names: Tilt, Orbit

### Recommended Property Values for Propiconazole

Solubility in Water (mg/L): 110

Field Half Life (days): 110

Soil Sorption Coefficient (ml/g): 1000

Vapor Pressure (mm Hg): 4.2 x 10 -7

Clearys Fungo Flo

## THIOPHANATE-METHYL

Chemical name: Dimethyl 4,4'-(O-phenylene) bis(3-thioallophanate)

Diseases controlled: Broad spectrum, systemic

Trade name: Duosan Broad Spectrum Systemic-Contact Fungicide
Registrant: Grace Sierra Crop Protection Company
EPA Reg. No.: 58185-11
Crops protected: Dogwood, juniper and many ornamentals
Formulation: 15% thiophanate-methyl, 60% mancozeb
75% wettable powder

| | |
|---|---|
| Trade name: | Duosan WSB Wettable Powder |
| Registrant: | Grace Sierra Crop Protection Company |
| EPA Reg. No.: | 58185-28 |
| Crops protected: | Dogwood, juniper and many ornamentals |
| Formulation: | 15% thiophanate-methyl, 60% mancozeb; wettable powder |

Recommended Property Values for Thiophanate-methyl

| | |
|---|---|
| Solubility in Water (mg/L): | 3.5 |
| Field Half Life (days): | 10 |
| Soil Sorption Coefficient (ml/g): | 1830 |
| Vapor Pressure (mm Hg): | $< 10^{-7}$ |

## THIRAM

| | |
|---|---|
| Chemical name: | Tetramethyl thiuramdisulfide |
| Diseases controlled: | Seed decay, damping-off, seedling blights (seed protectant); soft rots (also as animal repellent). |
| Trade name: | Gustafson 42-S |
| Registrant: | Gustafson Inc. |
| EPA Reg. No.: | 7501-14 |
| Crops protected: | Fruit trees and ornamentals |
| Formulation: | 42% flowable concentrate |

Recommended Property Values for Thiram

| | |
|---|---|
| Solubility in Water (mg/L): | 30 |
| Field Half Life (days): | 15 |
| Soil Sorption Coefficient (ml/g): | 670 |
| Vapor pressure (mm Hg): | $< 10^{-5}$ |

## TRIADIMEFON

Chemical name: 1-(4-chlorophenoxy)-3,3-dimethyl-1-(1H-1,2,4-triazol-1-yl)-2-butanone

Diseases controlled: Rusts

Trade name: Bayleton 50% DF Fungicide
Registrant: Miles, Inc.
EPA Reg. No.: **SLN WA-800020 (Washington only)**, Parent EPA No. 3125-320
Crops protected: Fruit and ornamental trees

### Recommended Property Values for Triadimefon

Solubility in Water (mg/L): 71.5

Field Half Life (days): 26

Soil Sorption Coefficient (ml/g): 1000

Vapor Pressure (mm Hg): 2 x 10 -7

## ZIRAM

Chemical name: Zinc dimethyldithiocarbamate.

Diseases controlled: Rusts, needle casts

Trade name: Gowan Ziram 76 WDG
Registrant: Gowan Company
EPA Reg. No.: 10163-106
Crops protected: Many fruit and nut trees and many ornamentals
Formulation: 76% granular

Trade name: Drexel Ziram 4L
Registrant: Drexel Chemical Co.
EPA Reg. No.: 19713-93
Crops protected: Pines

## Chapter 3.

## HERBICIDES

### BIFENOX

Chemical name: Methyl-5-(2,4-dichlorophenoxy)-2-nitrobenzoate

Weeds controlled: Broadleaves

Trade name: Modown Herbicide 4 Flowable
Registrant: Rhone-Poulenc Agricultural Company (TRANSFERRED)
EPA Reg. No.: 359-701
Crops protected: Forest trees, Russian olive, balsam fir

Trade name: Modown 80% Wettable Powder
Registrant: Rhone-Poulenc Agrochemical Division (TRANSFERRED)
EPA Reg. No.: 359-699
Crops protected: white pine
Formulation: 80% wettable powder

Recommended Property Values for Bifenox

| | |
|---|---|
| Solubility in Water (mg/L): | 0.389 |
| Field Half Life (days): | 7 |
| Soil Sorption Coefficient (ml/g): | 10000 |
| Vapor Pressure (mm Hg): | 2.4 x 10 -6 |

### DCPA

Chemical name: Dimethyl tetrachloroterephthalate

Weeds controlled: Many grasses and broadleaves (pre-emergence)

Trade name: Dacthal 75%
Registrant: Platte Chemical Company
EPA Reg. No.: 50534-20-34704
Crops protected: Many conifers, hardwoods and ornamentals
Formulation: 75% wettable powder

Recommended Property Values for DCPA

| | |
|---|---|
| Solubility in Water (mg/L): | 0.5 |
| Field Half Life (days): | 100 |
| Soil Sorption Coefficient (ml/g): | 5000 |
| Vapor Pressure (mm Hg): | 2.5 x 10 -6 |

## DICHLOBENIL

| | |
|---|---|
| Chemical name: | Dichlorobenzonitrile |
| Weeds controlled: | Selective herbicide |
| Trade name: | ACME Agricultural Products<br>Norsac 4G Dichlobenil Herbicide |
| Registrant: | PBI/Gordon Corporation |
| EPA Reg. No.: | 2217-675 |
| Crops protected: | Forest conifers |
| Formulation: | 4% granular |
| Trade name: | Casoron G-4 Herbicide |
| Registrant: | Drexel Chemical Company |
| EPA Reg. No.: | 19713-343 |
| Crops protected: | Forest conifers |
| Formulation: | 4% granular |

Recommended Property Values for Dichlobenil

| | |
|---|---|
| Solubility in Water (mg/L): | 21.2 |
| Field Half Life (days): | 60 |
| Soil Sorption Coefficient (ml/g): | 400 |
| Vapor Pressure (mm Hg): | 10 -3 |

## EPTC

| | |
|---|---|
| Chemical name: | Ethyl dipropylthiocarbamate |
| Weeds controlled: | Some grasses and broadleaves |

| | |
|---|---|
| Trade name: | Eptam Plus 6-E |
| Registrant: | ICI Americas, Inc. |
| EPA Reg. No.: | 10182-251 |
| Crops protected: | Forest conifers |
| Formulation: | 73% emulsifiable concentrate |

| | |
|---|---|
| Trade name: | Genep EPTC 7EC |
| Registrant: | ICI Americas, Inc. |
| EPA Reg. No.: | 10182-284 |
| Crops protected: | Forest conifers |
| Formulation: | 88% emulsifiable concentrate |

| | |
|---|---|
| Trade name: | Drexel EPTC-7EC |
| Registrant: | Drexel Chemical Company |
| EPA Reg. No.: | 19713-101 |
| Crops protected: | Forest conifers |
| Formulation: | 87% emulsifiable concentrate |

| | |
|---|---|
| Trade name: | Eptam 5-G Granules |
| Registrant: | ICI Americas, Inc. |
| EPA Reg. No.: | 10182-155 |
| Crops protected: | Many conifers, hardwoods and ornamentals |
| Formulation: | 5% granules |

Recommended Property Values for EPTC

| | |
|---|---|
| Solubility in Water (mg/L): | 344 |
| Field Half Life (days): | 6 |
| Soil Sorption Coefficient (ml/g): | 200 |
| Vapor Pressure (mm Hg): | 3.4 x 10 -2 |

## FLUAZIFOP-P-BUTYL

| | |
|---|---|
| Chemical name: | Butyl 2-(4-((5-(trifluoromethyl)-2-pyridinyl)oxy) phenoxyl)propanoate |
| Weeds controlled: | Most grasses |

| | |
|---|---|
| Trade name: | Fusilade 2000 1E Herbicide |
| Registrant: | ICI Americas, Inc. |
| EPA Reg. No.: | 10182-88 |
| Crops protected: | Forest conifers |
| Formulation: | 13% emulsifiable concentrate |

| | |
|---|---|
| Trade name: | Fusilade 2000 |
| Registrant: | ICI Americas, Inc. |
| EPA Reg. No.: | 10182-104 |
| Crops protected: | Forest conifers, Christmas trees |
| Formulation: | 13% emulsifiable concentrate |

Recommended Property Values for Fluazifop-P-Butyl

| | |
|---|---|
| Solubility in Water (mg/L): | 2 |
| Field Half Life (days): | 15 |
| Soil Sorption Coefficient (ml/g): | 5700 |
| Vapor Pressure (mm Hg): | 2.5 x 10 -7 |

## GLYPHOSATE

| | |
|---|---|
| Chemical name: | Isopropylamine glyphosate (N-(phosphonomethyl)glycine |
| Weeds controlled: | Most grasses and broadleaves, many woody perenniels. Non selective, post-emergence herbicide. |

| | |
|---|---|
| Trade name: | Roundup |
| Registrant: | Monsanto Company |
| EPA Reg. No.: | 524-308 |
| Crops protected: | Forest conifers |
| Formulation: | 41% soluble concentrate |

Recommended Property Values for Glyphosate

| | |
|---|---|
| Solubility in Water (mg/L): | 900000 |
| Field Half Life (days): | 47 |
| Soil Sorption Coefficient (ml/g): | 24000 |
| Vapor Pressure (mm Hg): | 0 |

## LACTOFEN

| | |
|---|---|
| Chemical name: | (Carboethoxy)ethyl 5-(2-chloro-4-(trifluoromethyl) phenoxy) nitrobenzoate |
| Weeds controlled: | Some broadleaf weeds (pre- and post-emergence) |
| Trade name: | Cobra Herbicide |
| Registrant: | Valent U.S.A. Corporation |
| EPA Reg. No.: | 59639-34 |
| Crops protected: | Forest conifers |
| Formulation: | 23% emulsifiable concentrate |

Recommended Property Values for Lactofen

| | |
|---|---|
| Solubility in Water (mg/L): | 0.1 |
| Field Half Life (days): | 3 |
| Soil Sorption Coefficient (ml/g): | 10000 |
| Vapor Pressure (mm Hg): | 8 x 10 -9 |

## METOLACHLOR

| | |
|---|---|
| Chemical name: | Chloro-N-(2-ethyl-6-methylphenyl)-N-(2-methoxy-4-methyl ethyl)acetamide |
| Weeds controlled: | Most grasses and broadleaf weeds (pre-emergence) |
| Trade name: | Pennant 5G Herbicide |
| Registrant: | Ciba-Geigy Corporation |
| EPA Reg. No.: | 100-665 |
| Crops protected: | Most conifers, many hardwoods and ornamentals |
| Formulation: | 5% granular |
| Trade name: | Pennant Liquid Herbicide |
| Registrant: | Ciba-Geigy Corporation |
| EPA Reg. No.: | 100-691 |
| Crops protected: | Most conifers, many hardwoods and ornamentals |
| Formulation: | 85% soluble concentrate |

Recommended Property Values for Metolachlor

| | |
|---|---|
| Solubility in Water (mg/L): | 530 |
| Field Half Life (days): | 90 |
| Soil Sorption Coefficient (ml/g): | 200 |
| Vapor Pressure (mm Hg): | 3.135 x 10 -5 |

## NAPROPAMIDE

Chemical name: Diethyl-2-(1-naphthalenyloxyl)propanamide

Weeds controlled: Some grasses and broadleaves

| | |
|---|---|
| Trade name: | Devrinol 5-G Ornamental |
| Registrant: | ICI Americas, Inc. |
| EPA Reg. No.: | 10182-242 |
| Crops protected: | Forest conifers, many hardwoods and ornamentals |
| Formulation: | 5% granular |

| | |
|---|---|
| Trade name: | Devrinol 50-WP Ornamental |
| Registrant: | ICI Americas, Inc. |
| EPA Reg. No.: | 10182-231 |
| Crops protected: | Many conifers, hardwoods and ornamentals |
| Formulation: | 50% wettable powder |

Recommended Property Values for Napropamide

| | |
|---|---|
| Solubility in Water (mg/L): | 74 |
| Field Half Life (days): | 70 |
| Soil Sorption Coefficient (ml/g): | 400 |
| Vapor Pressure (mm Hg): | 1.7 x 10 -7 |

## ORYZALIN

Chemical name: Dinitro-N4,N4-dipropylsulfanilamide

Weeds controlled: Annual grasses and broadleaf weeds (pre-emergence)

| | |
|---|---|
| Trade name: | Surflan A.S. |
| Registrant: | DowElanco |
| EPA Reg. No.: | 62719-113 |
| Crops protected: | Forest conifers |
| Formulation: | 40% flowable concentrate |

Recommended Property Values for Oryzalin

| | |
|---|---|
| Solubility in Water (mg/L): | 2.5 |
| Field Half Life (days): | 20 |
| Soil Sorption Coefficient (ml/g): | 600 |
| Vapor Pressure (mm Hg): | < 10 -8 |

## OXADIAZON

| | |
|---|---|
| Chemical name: | Butyl-4-(2,4-dichloro-5-isopropoxyphenyl-delta 2-1,3,4-oxadiazolin |
| Weeds controlled: | Annual grasses and broadleaves (pre- and early post-emergence) |

| | |
|---|---|
| Trade name: | Lebanon Country Club 19-4-9 with Ronstar |
| Registrant: | Lebanon Chemical Corporation |
| EPA Reg. No.: | 961-340 |
| Crops protected: | Forest conifers |
| Formulation: | 1.7% granular |

| | |
|---|---|
| Trade name: | Gold Kist 5-5-25 with Ronstar |
| Registrant: | Gold Kist, Inc. |
| EPA Reg. No.: | 2269-175 |
| Crops protected: | Forest conifers |
| Formulation: | 1.5% granular |

| | |
|---|---|
| Trade name: | Turf Supreme Plus Ronstar |
| Registrant: | J.R. Simplot Company |
| EPA Reg. No.: | 7001-346 |
| Crops protected: | Forest conifers |
| Formulation: | 1.2% granular |

| | |
|---|---|
| Trade name: | Turf Pride 15-0-15 with Ronstar |
| Registrant: | Howard Fertilizer Company, Inc. |
| EPA Reg. No.: | 35512-24 |
| Crops protected: | Forest conifers |
| Formulation: | 1% granular |

| | |
|---|---|
| Trade name: | Turf Pride 38-0-0 with Ronstar |
| Registrant: | Howard Fertilizer Company, Inc. |
| EPA Reg. No.: | 35512-25 |
| Crops protected: | Forest conifers |
| Formulation: | 1.5% granular |

| | |
|---|---|
| Trade name: | Turf Pride 12-0-12 with Ronstar |
| Registrant: | Howard Fertilizer Company, Inc. |
| EPA Reg. No.: | 35512-26 |
| Crops protected: | Forest conifers |
| Formulation: | 0.8% granular |

| | |
|---|---|
| Trade name: | Harrell's Ronstar 1.5 with Fertilizer |
| Registrant: | Harrell's, Inc. |
| EPA Reg. No.: | 52287-2 |
| Crops protected: | Forest conifers |
| Formulation: | 1.5% granular |

Recommended Property Values for Oxadiazon

| | |
|---|---|
| Solubility in Water (mg/L): | 0.7 |
| Field Half Life (days): | 60 |
| Soil Sorption Coefficient (ml/g): | 3200 |
| Vapor Pressure (mm Hg): | 10 -6 |

## OXYFLUORFEN

| | |
|---|---|
| Chemical name: | Chloro-1-(3-ethoxy-4-nitrophenoxy)-4-(trifluoromethyl) benzene |
| Weeds controlled: | Some grasses and broadleaves (pre- and post-emergence) |

| | |
|---|---|
| Trade name: | Goal 1.6E Herbicide |
| Registrant: | Rohm and Haas Company |
| EPA Reg. No.: | 707-174 |
| Crops protected: | Forest conifers |
| Formulation: | 19% emulsifiable concentrate |

Recommended Property Values for Oxyfluorfen

| | |
|---|---|
| Solubility in Water (mg/L): | 0.1 |
| Field Half Life (days): | 35 |
| Soil Sorption Coefficient (ml/g): | 100000 |
| Vapor Pressure (mm Hg): | 2 x 10 -7 |

## PRONAMIDE

| | |
|---|---|
| Chemical name: | Propyzamide |
| Weeds controlled: | Some broadleaves (pre-emergence) and some grasses |
| Trade name: | Kerb 50-W in W.S.P. |
| Registrant: | Rohm and Haas Company |
| EPA Reg. No.: | 707-159 |
| Crops protected: | Many conifers, hardwoods and ornamentals |
| Formulation: | 50% wettable powder |

Recommended Property Values for Pronamide

| | |
|---|---|
| Solubility in Water (mg/L): | 15 |
| Field Half Life (days): | 60 |
| Soil Sorption Coefficient (ml/g): | 200 |
| Vapor Pressure (mm Hg): | 8.5 x 10 -5 |

## SIMAZINE

| | |
|---|---|
| Chemical name: | Chloro-4,6-bis(ethylamino)-s-triazine |
| Weeds controlled: | Most annual grasses and broadleaf weeds (pre-emergence) |

Trade name: IDA, Inc. Simazine Herbicide 80W
Registrant: Drexel Chemical Company
EPA Reg. No.: 19713-271
Crops protected: Forest conifers
Formulation: 80% wettable powder

Trade name: Simazine 4L
Registrant: Drexel Chemical Company
EPA Reg. No.: 19713-273
Crops protected: Forest conifers
Formulation: 40% emulsifiable concentrate

Trade name: Sim-Trol 4L Simazine Flowable Herbicide
Registrant: Oxon Italia S.P.A.
EPA Reg. No.: 35915-11
Crops protected: Forest conifers
Formulation: 43% flowable concentrate

Trade name: Sim-Trol 9DF
Registrant: Oxon Italia S.P.A.
EPA Reg. No.: 35915-12
Crops protected: Forest conifers
Formulation: 90% wettable powder

Trade name: Princep 4G
Registrant: Ciba-Geigy Corporation
EPA Reg. No.: 100-435
Crops protected: Many conifers, hardwoods and ornamentals
Formulation: 4% granular

Trade name: Princep 80W
Registrant: Ciba-Geigy Corporation
EPA Reg. No.: 100-437
Crops protected: Many conifers, hardwoods and ornamentals
Formulation: 80% wettable powder

Trade name: Princep 4L (or Princep Liquid)
Registrant: Ciba-Geigy Corporation
EPA Reg. No.: 100-526
Crops protected: Many conifers, hardwoods and ornamentals
Formulation: 42% flowable concentrate

Trade name: Princep Liquid (or Princep 4L)
Registrant: Ciba-Geigy Corporation
EPA Reg. No.: 100-526
Crops protected: Many conifers, hardwoods and ornamentals
Formulation: 42% flowable concentrate

Trade name: Princep Caliber 90
Registrant: Ciba-Geigy Corporation
EPA Reg. No.: 100-603
Crops protected: Many conifers, hardwoods and ornamentals
Formulation: 90% (no data)

| | |
|---|---|
| Trade name: | Simazine 80W |
| Registrant: | Platte Chemical Company |
| EPA Reg. No.: | 34704-685 |
| Crops protected: | All conifers, hardwoods and ornamentals |
| Formulation: | 80% wettable powder |

| | |
|---|---|
| Trade name: | Simazine 90 WDG |
| Registrant: | Platte Chemical Company |
| EPA Reg. No.: | 34704-686 |
| Crops protected: | Many conifers, hardwoods and ornamentals |
| Formulation: | 90% (no data) |

| | |
|---|---|
| Trade name: | Simazine 4L Flowable Herbicide |
| Registrant: | Platte Chemical Company |
| EPA Reg. No.: | 34704-687 |
| Crops protected: | Many conifers, hardwoods and ornamentals |
| Formulation: | 43% (no data) |

Recommended Property Values for Simazine

| | |
|---|---|
| Solubility in Water (mg/L): | 6.2 |
| Field Half Life (days): | 60 |
| Soil Sorption Coefficient (ml/g): | 130 |
| Vapor Pressure (mm Hg): | 2.21 x 10 -8 |

## SULFOSATE

| | |
|---|---|
| Chemical name: | Trimethylsulfonium carboxymethylaminomethyl phosphonate |
| Weeds controlled: | Broad range of grasses and broadleaves, some woody perenniels |

| | |
|---|---|
| Trade name: | Touchdown 6 Herbicide |
| Registrant: | ICI Americas, Inc. |
| EPA Reg. No.: | 10182-324 |
| Crops protected: | Forest conifers |
| Formulation: | 58% flowable concentrate |

| | |
|---|---|
| Trade name: | Touchdown |
| Registrant: | ICI Americas, Inc. |
| EPA Reg. No.: | 10182-324 |
| Crops protected: | Forest conifers |
| Formulation: | 58% flowable concentrate |

# Chapter 4.

# INSECTICIDES

## ACEPHATE

Chemical name: Dimethyl acetylphosphoramidothioate

Insects controlled: Weevils, imported fire ants

Trade name: Valent Orthene Turf, Tree & Ornamental Spray
Registrant: Valent U.S.A. Corporation
EPA Reg. No.: 59639-26
Crops protected: Arborvitae, yew and other ornamentals
Formulation: 75% soluble concentrate

Trade name: Orthene 75S
Registrant: Valent U.S.A. Corporation
EPA Reg. No.: 59639-26
Crops protected: Arborvitae, yew and other ornamentals
Formulation: 75% soluble concentrate

### Recommended Property Values for Acephate

| | |
|---|---|
| Solubility in Water (mg/L): | 818000 |
| Field Half Life (days): | 3 |
| Soil Sorption Coefficient (ml/g): | 2 |
| Vapor Pressure (mm Hg): | 1.7 x 10 -6 |

## AZINPHOS-METHYL

Chemical name: Dimethyl S-((4-oxo-1,2,3-benzotriazin-3(4H)-yl)methyl) phosphorodithioate

Insects controlled: Mites, thrips, cone midges, aphids, leafhoppers, scales, cone moths, shoot moths, tip moths, weevils.

Trade name: Clean Crop Sniper 2-E
Registrant: Platte Chemical Company
EPA Reg. No.: 34704-691
Crops protected: Ornamentals
Formulation: 22% emulsifiable concentrate

Trade name: Azinphos-M 50W
Registrant: Platte Chemical Company
EPA Reg. No.: 46077-7-34704
Crops protected: Ornamentals
Formulation: 50% wettable powder

Trade name: Azinphos-M 2 EC
Registrant: Platte Chemical Company
EPA Reg. No.: 46077-8-34704
Crops protected: Ornamentals
Formulation: 22% emulsifiable concentrate

Trade name: Guthion 2S
Registrant: Mobay Corporation
EPA Reg. No.: 3125-123
Crops protected: Ornamentals
Formulation: 22% emulsifiable concentrate

Trade name: Guthion 50% Wettable Powder
Registrant: Mobay Corporation
EPA Reg. No.: 3125-193
Crops protected: Ornamentals
Formulation: 50% wettable powder

Trade name: Guthion 50% Wettable Powder
Registrant: Mobay Corporation
EPA Reg. No.: 3125-301
Crops protected: Ornamentals
Formulation: 50% wettable powder

Trade name: Guthion 3 Flowable
Registrant: Mobay Corporation
EPA Reg. No.: 3125-338
Crops protected: Ornamentals
Formulation: 30% flowable concentrate

Trade name: Guthion 35% Wettable Powder
Registrant: Mobay Corporation
EPA Reg. No.: 3125-378
Crops protected: Ornamentals
Formulation: 35% wettable powder

Trade name: Guthion 35% WP-Water Soluble
Registrant: Mobay Corporation
EPA Reg. No.: 3125-379
Crops protected: Ornamentals
Formulation: 35% wettable powder

Recommended Property Values for Azinphos-methyl

| | |
|---|---|
| Solubility in Water (mg/L): | 29 |
| Field Half Life (days): | 10 |
| Soil Sorption Coefficient (ml/g): | 1000 |
| Vapor Pressure (mm Hg): | 2 x 10 -7 |

B.T.

| | |
|---|---|
| Chemical name: | Bacillus thuringiensis |
| Insects controlled: | Fungus gnats |
| Trade name: | Vectobac-12 AS |
| Registrant: | Abbott Laboratories |
| EPA Reg. No.: | 275-66 |
| Crops protected: | Ornamentals |
| Formulation: | 1% flowable concentrate |
| Trade name: | Dipel 6AF Worm Killer |
| Registrant: | Abbott Laboratories |
| EPA Reg. No.: | 275-59 |
| Crops protected: | Forest trees, ornamental woody shrubs, oranmental trees |
| Formulation: | 2% flowable concentrate |
| Trade name: | Dipel 8AF Worm Killer |
| Registrant: | Abbott Laboratories |
| EPA Reg. No.: | 275-67 |
| Crops protected: | Forest trees |
| Trade name: | Dipel Worm Killer Wettable Powder Biological Insecticide |
| Registrant: | Abbott Laboratories |
| EPA Reg. No.: | 275-18 |
| Crops protected: | Forest trees (greenhouse), ornamental trees (greenhouse) |
| Trade name: | Agway Dipel 4L |
| Registrant: | Agway, Inc. |
| EPA Reg. No.: | 8590-582 |
| Crops protected: | Forest trees (greenhouse), ornamental shade trees (greenhouse) |

## CALCIUM POLYSULFIDE

Chemical name: Calcium polysulfide

Insects controlled: Mites, aphids

Trade name: Cooke Sulf-R-Spray
Registrant: Cooke Laboratory Products
EPA Reg. No.: 802-73-909
Crops protected: Plums, thuja, cedar, elm, juniper, maple, pine, spruce, yew, cottonwood and other ornamentals
Formulation: 29% souluble concentrate

## CARBARYL

Chemical name: 1-naphthyl-N-methylcarbamate

Insects controlled: Broad sprectrum

Trade name: Ortho Isotox Insect Spray
Registrant: Chevron Chemical Company
EPA Reg. No.: 239-2514
Crops protected: Ornamental plants

Trade name: Get-A-Bug Snail, Slug and Insect Killer
Registrant: Chevron Chemical Company
EPA Reg. No.: 239-2514
Crops protected: Ground covers

Trade name: Sevin Brand XLR Carbaryl Insecticide
Registrant: Rhone-Poulenc Agricultural Company
EPA Reg. No.: 264-333
Crops protected: Nursery stock

Trade name: Sevin Brand SL Carbaryl Insecticide
Registrant: Rhone-Poulenc Agricultural Company
EPA Reg. No.: 264-3355
Crops protected: Nursery stock

Trade name: Sevin Brand 4F Carbaryl Insecticide
Registrant: Rhone-Poulenc Agricultural Company
EPA Reg. No.: 264-349
Crops protected: Nursery stock

Trade name: Riverside Carbaryl 4L
Registrant: Riverside/Terra Corporation
EPA Reg. No: 9779-260
Crops protected: Nursery stock

Trade name: Carbaryl 90 DF
Registrant: Riverside/Terra Corporation
EPA Reg. No.: 9779-294
Crops protected: Nursery stock and beds

Trade name: Coastox Meta Carbaryl 2-4 Snail Pellets
Registrant: Western Farm Service, Inc.
EPA Reg. No.: 11656-20
Crops protected: Ornamental plants

Trade name: Union Carbide Sevin Brand Sprayable Carbaryl Insecticide
Registrant: Rhone-Poulenc Agricultural Company
EPA Reg. No.: **SLN CA-830007 (California only)**, Parent EPA No. 264-316
Crops protected: Nut and many fruit trees

Trade name: Union Carbide Sevin Brand 50-W Insecticide
Registrant: Rhone-Poulenc Agricultural Company
EPA Reg. No.: **SLN CA-830007 (California only)**, Parent EPA No. 264-314
Crops protected: Nut and many fruit trees

Recommended Property Values for Carbaryl

| | |
|---|---|
| Solubility in Water (mg/L): | 120 |
| Field Half Life (days): | 10 |
| Soil Sorption Coefficient (ml/g): | 300 |
| Vapor Pressure (mm Hg): | 1.2 x 10 -6 |

## CHLORPYRIFOS

Chemical name: Diethyl O-(3,5,6-trichloro-2-pyridyl) phosphorothioate

Insects controlled: Many defoliators, beetles, caterpillars, aphids, mites, borers, sprintails, termites, whiteflies, fire ants, weevils, grasshoppers, cockroaches, and others.

Trade name: SMCP Dursban 2E Insecticide
Manufacturer: Southern Mill Creek Products
EPA Reg. No.: 6720-59
Crops protected: Forest trees
Formulation: 24% emulsifiable concentrate

| | |
|---|---|
| Trade name: | Dursban 1E Insectide |
| Registrant: | Southern Mill Creek Products |
| EPA Reg. No.: | 6720-148 |
| Crops protected: | Forest trees |
| Formulation: | 13% emulsifiable concentrate |

| | |
|---|---|
| Trade name: | Dursban 4E Insecticide |
| Registrant: | DowElanco |
| EPA Reg. No.: | 62719-11 |
| Crops protected: | Forest trees |
| Formulation: | 45% emulsifiable concentrate |

| | |
|---|---|
| Trade name: | Dursban Insecticide Concentrate |
| Registrant: | Ford's Chemical and Service |
| EPA Reg. No.: | 10370-64 |
| Crops protected: | Ornamentals |
| Formulation: | 13% emulsifiable concentrate |

Recommended Property Values for Chlorpyrifos

| | |
|---|---|
| Solubility in Water (mg/L): | 0.4 |
| Field Half Life (days): | 30 |
| Soil Sorption Coeficient (ml/g): | 6070 |
| Vapor Pressure(mm Hg): | 1.7 x 10 -5 |

## DIAZINON

| | |
|---|---|
| Chemical name: | Diethyl O-(2-isopropyl-6-methyl-4-pyrimidinyl) phosphorothioate |
| Insects controlled: | Mites, thrips, weevils, flies, gnats, midges, mosquitoes, scales, aphids, psyllids, ants, moths, caterpillars, cockroaches, grasshoppers, crickets, borers, cherry fruit fly, apple maggot. |

| | |
|---|---|
| Trade name: | Knox Out PT 1500R |
| Registrant: | Whitmire Research Laboratories, Inc. |
| EPA Reg. No.: | 499-248 |
| Crops protected: | Honeysuckle, lilac, blue spruce, dogwood, juniper, malus and many ornamentals. |
| Formulation: | 0.5% microencapsulated |

Trade name: D.Z.N. Diazinon 50W (Nursery)
Registrant: Ciba-Geigy Corporation
EPA Reg. No.: **SLN OR-900005** (Oregon only), Parent EPA Reg. No. 100-460
Crops protected: Prunus, malus
Formulation: 50% wettable powder

Recommended Property Values for Diazinon

Solubility in Water (mg/l): 60

Field Half Life (days): 40

Soil Sorption Coefficient (ml/g): 1000

Vapor Pressure (mm Hg): 6 x 10 -5

## DICOFOL

Chemical name: Bis(chlorophenyl)-2,2,2-trichloroethanol

Insects controlled: Mites

Trade name: Kelthane 35
Registrant: Rohm and Haas Company
EPA Reg. No.: 707-205
Crops protected: Ornamentals
Formulation: 35% wettable powder/dust

Recommended Property Values for Dicofol

Solubility in Water (mg/L): 1

Field Half Life (days): 60

Soil Sorption Coefficient (ml/g): 180000

Vapor Pressure (mm Hg): negligible

## DIFLUBENZURON

Chemical name: Chlorophenyl)-3-(2,6-difluorobenzoyl) urea

Insects controlled: Tent caterpillar, tussock moths, gypsy moths, tip moths.

Trade name: Dimilin 4L
Registrant: Duphar Crop Protection, Inc.
EPA Reg. No.: 37100-54
Crops protected: Forest trees
Formulation: 40.4% soluble concentrate

Recommended Property Values for Diflubenzuron

Solubility in Water (mg/L): 0.08

Field Half Life (days): 10

Soil Sorption Coefficient (ml/g): 10000

Vapor Pressure (mm Hg): 9 x 10 -10

## DIMETHOATE

Chemical name: Dimethyl S-((methyl carbamoyl) methyl) phosphorodithioate

Insects controlled: Thrips, aphids, mites; systemic

Trade name: Dimethoate 400
Registrant: Platte Chemical Company
EPA Reg. No.: 34704-207
Crops protected: Citrus
Formulation: 44%, emulsifiable concentrate

Recommended Property Values for Dimethoate

| | |
|---|---|
| Solubility in Water (mg/L): | 39800 |
| Field in Half Life (days): | 7 |
| Soil Sorption Coefficient (ml/g): | 20 |
| Vapor Pressure (mm Hg): | 2.5 x 10 -5 |

## DINOCAP

Chemical name: Dinitro octyl phenyl crotonates and nitro octyl phenols

Insects controlled: Mites (and powdery mildew)

| | |
|---|---|
| Trade name: | Karathane WD |
| Registrant: | Rohm and Haas Company |
| EPA Reg. No.: | 707-53 |
| Crops protected: | Apples, cherries, peaches |
| Formulation: | 19.5% wettable powder |

| | |
|---|---|
| Trade name: | Karathane LC |
| Registrant: | Rohm and Haas Company |
| EPA Reg. No.: | 707-71 |
| Crops protected: | Apples, cherries, peaches |
| Formulation: | 37.4% emulsifiable concentrate |

Recommended Property Values for Dinocap

| | |
|---|---|
| Solubility in Water (mg/L): | 4 |
| Field Half Life (days): | 20 |
| Soil Sorption Coefficient (ml/g): | 550 |
| Vapor Pressure (mm Hg): | 4 x 10 -8 |

## D-PHENOTHRIN

Chemical name: Phenoxyphenyl)methyl d-cis and trans chrysanthemate

Insects controlled: Mites, whiteflies, aphids, ants, caterpillars, crickets

Trade name: PT 1400 Sumithrin
Registrant: Whitmire Research Laboratories, Inc.
EPA Reg. No.: 499-209
Crops protected: Honeysuckle, blue spruce, poplar, juniper and many ornamentals
Formulation: 0.5% d-phenothrin, 5% octyl bicycloheptane dicarboximide; pressurized liquid

## ENDOSULFAN

Chemical name: Hexachloro-1,5,5a,6,9,9a-hexahydro-6,9-methano-2,4,3-benzodioxathiepin-3-oxide, mixture of two isomers

Insects controlled: Borers, needle midges, aphids, peachtree borers

Trade name: Thiodan 50 WP
Registrant: FMC Corporation/Ag. Chemical Group
EPA Reg. No.: 279-1380
Crops protected: Douglas-fir, cherries, peaches, plums
Formulation: 50% wettable powder

Trade name: Thiodan 50WP
Registrant: Platte Chemical Company
EPA Reg. No.: 279-1380-34704
Crops protected: Douglas-fir, cherries, peaches, plums
Formulation: 50% wettable powder

Trade name: Thiodan 2 C.O. EC
Registrant: FMC Corporation/Ag. Chemical Group
EPA Reg. No.: 279-2659
Crops protected: Cherries, peaches, plums, prunes
Formulation: 23% emulsifiable concentrate

Trade name: Thiodan 3 EC
Registrant: FMC Corporation/Ag. Chemical Group
EPA Reg. No.: 279-2924
Crops protected: Douglas-fir, plums
Formulation: 34% emulsifiable concentrate

Trade name: Thiodan 3 E.C.
Registrant: Platte Chemical Company
EPA Reg. No.: 34704-21
Crops protected: Cherries, plums
Formulation: 33% emulsifiable concentrate

Trade name: Clean Crop Endocide 3E.C.
Registrant: Platte Chemical Company
EPA Reg. No.: 34704-68
Crops protected: Cherries, peaches, plums
Formulation: 34% emulsifiable concentrate

Recommended Property Values for Endosulfan

| | |
|---|---|
| Solubility in Water (mg/L): | 0.32 |
| Field Half Life (days): | 50 |
| Soil Sorption Coefficient (ml/g): | 12400 |
| Vapor Pressure (mm Hg): | 1.7 x 10 -7 |

## ESFENVALERATE

Chemical name: Cyano-(3-phenoxyphenyl) methyl-(S)-4-chloro-alpha-(1-methylethyl)benzeneacetate

Insects controlled: Pales weevils, weevils, chafers, seed bugs, chermids, conelet bugs, aphids, spittlebugs, adelgids, sawflies, red pine sawflies, European Pine sawflies, coneworms, seed chalcids, cranberry girdlers (adults), spruce budworms, tip moths, needle midges.

| | |
|---|---|
| Trade name: | Asana Insecticide 1.9 Emulsifiable Concentrate or Dupont Krovar I DF Herbicide |
| Registrant: | E.I. DuPont de Nemours and Company, Inc. |
| EPA Reg. No.: | 352-502 |
| Crops protected: | Forest trees |
| Formulation: | 24% emulsifiable concentrate |

| | |
|---|---|
| Trade name: | Dupont Asana XL Insecticide |
| Registrant: | E.I. DuPont de Nemours and Company, Inc. |
| EPA Reg. No.: | 352-515 |
| Crops protected: | Forest trees |
| Formulation: | 8% emulsifiable concentrate |

Recommended Property Values for Esfenvalerate

| | |
|---|---|
| Solubility in Water (mg/L): | 0.002 |
| Field Half Life (days): | 35 |
| Soil Sorption Coefficient (ml/g): | 5300 |
| Vapor Pressure (mm Hg): | 1.1 x 10 -8 |

## FENAMIPHOS

Chemical name: Ethyl 4-(methylthio)-m-tolyl isopropylphosphoramidate

Insects controlled: Nematodes, insects

Trade name: Nemacur 10% Turf & Ornamental Nematicide
Registrant: Mobay Corporation
EPA Reg. No.: 3125-237
Crops protected: Juniper, pine, spruce, yew and many ornamentals
Formulation: 10% granular

Trade name: Nemacur 3
Registrant: Mobay Corporation
EPA Reg. No. 3125-283
Crops protected: Ornamentals
Formulation: 35% emulsifiable concentrate

Recommended Property Values for Fenamiphos

| | |
|---|---|
| Solubility in Water (mg/L): | 400 |
| Field Half Life (days): | 50 |
| Soil Sorption Coefficient (ml/g: | 100 |
| Vapor Pressure (mm Hg): | 1 x 10 -6 |

## FENBUTATIN-OXIDE

Chemical name: Hexakis(2-methyl-2-phenylpropyl)distannoxane

Insects controlled: Mites

Trade name: Vendex 50WP
Registrant: E.I. DuPont, Ag. Products BMP38-6176
EPA Reg. No.: 352-480
Crops protected: Ornamentals
Formulation: 50% wettable powder

Trade name: Vendex 4L
Registrant: E.I. DuPont, Ag. Products BMP38-6176
EPA Reg. No.: 352-493
Crops protected: Ornamentals
Formulation: 42% emulsifiable concentrate

## FENVALERATE

| | |
|---|---|
| Chemical name: | Cyano(3-phenoxyphenyl)methyl 4-chloro-alpha-(1-methylethyl)benzeneacetate |
| Insects controlled: | Weevils, chafers, seed bugs, conelet bugs, spittlebugs, aphid, adelgid, chermid, sawflies, chalcid, coneworms, cranberry girdlers (adult), tip moths, needle midges. |
| Trade name: | Pydrin Insecticide 2.4 Emulsible Concentrate |
| Registrant: | E.I. DuPont de Nemours and Company, Inc. |
| EPA Reg. No.: | 352-485 |
| Crops protected: | Forest trees |
| Formulation: | 30% emulsifiable concentrate |

Recommended Property Values for Fenvalerate

| | |
|---|---|
| Solubility in Water (mg/L): | 0.002 |
| Field Half Life (days): | 35 |
| Soil Sorption Coefficient (ml/g): | 5300 |
| Vapor Pressure (mm Hg): | 1.1 x 10 -8 |

## ISOFENPHOS

| | |
|---|---|
| Chemical name: | Methylethyl 2-((ethoxyl((1-methylethyl)amino) phosphinothioyl)oxy)benzoate |
| Insects controlled: | Weevils, billbugs, beetles, grubs, mole crickets |
| Trade name: | Oftanol 2 Insecticide |
| Registrant: | Mobay Corporation |
| EPA Reg. No.: | 3125-342 |
| Crops protected: | Ornamentals |
| Formulation: | 22% emulsifiable concentrate |

Recommended Property Values for Isofenphos

| | |
|---|---|
| Solubility in Water (mg/L): | 24 |
| Field Half Life (days): | 150 |
| Soil Sorption Coefficient (ml/g): | 600 |
| Vapor Pressure (mm Hg): | 3 x 10 -6 |

## LINDANE

Chemical name: Gamma isomer of benzene hezachloride

Insects controlled: Pine coneworm, seed insects, cone insects

| | |
|---|---|
| Trade name: | Isotox Lindane Spray No. 200 |
| Registrant: | Chevron Chemical Company |
| EPA Reg. No.: | **SLN WA-760014** (Washington only), Parent EPA No. 239-2363 |
| Crops protected: | Forest trees |
| Formulation: | 59% aromatic petroleum derivative solvent and 20% Lindane; emulsifiable concentrate |
| Trade name: | Valent Lindane No. 200 Spray |
| Registrant: | Valent U.S.A. Corporation |
| EPA Reg. No.: | **SLN OR-840051** (Oregon only), Parent EPA No. 239-2518 |
| Crops protected: | Forest trees |

Recommended Property Values for Lindane

| | |
|---|---|
| Solubility in Water (mg/L): | 7 |
| Field Half Life (days): | 400 |
| Soil Sorption Coefficient (ml/g): | 1100 |
| Vapor Pressure (mm Hg): | 3.3 x 10 -5 |

## MALATHION

Chemical name: Dimethyl phosphorodithioate of diethyl mercaptosuccinate

Insects controlled: Sowbugs, millipedes, springtails

| | |
|---|---|
| Trade name: | Cythion |
| Registrant: | Helena Chemical Company |
| EPA Reg. No.: | 5905-196 |
| Crops protected: | Ornamental (greenhouse-soil treatment) |
| Formulation: | 56% emulsifiable concentrate |

Recommended Property Values for Malathion

| | |
|---|---|
| Solubility in Water (mg/L): | 130 |
| Field Half Life (days): | 1 |
| Soil Sorption Coefficient (ml/g): | 1800 |
| Vapor Pressure (mm Hg): | 8 x 10 -6 |

## METALDEHYDE

| | |
|---|---|
| Chemical name: | Tetramethyl 1-1,3,5,7-tetraoxocane |
| Insects controlled: | Snails, slugs, sowbugs, millipedes |
| Trade name: | Metaldehyde Methiocarb Granules 2-1 |
| Registrant: | Amvac Chemical Corporation |
| EPA Reg.No.: | 5481-195 |
| Crops protected: | Nursery (soil treatment) |
| Formulation: | 19% Methiocarb and 2% Metaldehyde; granular |

Recommended Property Values for Metaldehyde

| | |
|---|---|
| Solublity in Water (mg/L): | 230 |
| Field Half Life (days): | 10 |
| Soil Sorption Coefficient (ml/g): | 240 |
| Vapor Pressure (mm Hg): | low |

## METHIDATHION

Chemical name: Dimethyl phosphorodithioate, S-ester with 4-mercapto methyl)-2-methoxy thiadiazolin

Insects controlled: Scales

Trade name: Supracide 2E
Registrant: Ciba-Geigy Corporation
EPA Reg. No.: 100-501
Crops protected: Woody ornamentals
Formulation: 24% emulsifiable concentrate

### Recommended Property Values for Methidathion

Solubility in Water (mg/L): 220

Field Half Life (days): 7

Soil Sorption Coefficient (ml/g): 400

Vapor Pressure (mm Hg): 3.4 x 10 -6

## METHIOCARB

Chemical name: Dimethyl-4-(methylthio)phenyl methylcarbamate

Insects controlled: Snails, slugs, sowbugs, millipedes

Trade name: Metaldehyde Methiocarb Granules 2-1
Registrant: Amvac Chemical Corporation
EPA Reg. No.: 5481-195
Crops protected: Nursery soil
Formulation: 19% Methiocarb and 2% Metaldehyde; granular

### Recommended Property Values for Methiocarb

Solubility in Water (mg/L): 24

Field Half Life (days): 30

Soil Sorption Coefficient (ml/g): 300

Vapor Pressure (mm Hg): 1.2 x 10 -4

## METHOMYL

Chemical name: Methyl N-((methylcarbamoyl)oxy)thioacetimidate

Insects controlled: Tent caterpillars, spruce budworms

Trade name: Dupont Lannate L Methomyl Insecticide
Registrant: E.I. DuPont de Nemours and Company, Inc.
EPA Reg. No.: 352-370
Crops protected: Forest trees
Formulation: 24% soluble concentrate

Trade name: Dupont Lannate LV Insecticide
Registrant: E.I. DuPont de Nemours and Company, Inc.
EPA Reg. No.: 352-384
Crops protected: Forest trees
Formulation: 29% soluble concentrate

### Recommended Property Values for Methomyl

| | |
|---|---|
| Solubility in Water (mg/L): | 58000 |
| Field Half Life (days): | 30 |
| Soil Sorption Coefficient (ml/g): | 72 |
| Vapor Pressure (mm Hg): | 5 x 10 -5 |

## OXAMYL

Chemical name: Oxamimidic acid, methyl N',N'-dimethyl-N-((methylcarbamoyl) oxy) thiooxaminidate.

Insects controlled: Mites, thrips, beetles, scales, weevils, gnats, aphids, whiteflies, leafhoppers

Trade name: Vydate L
Registrant: E.I. DuPont, Ag. Products BMP38-6176
EPA Reg. No.: 352-372
Crops protected: Apples, pears, cherries, peaches, boxwood and many ornamentals
Formulation: 24% soluble concentrate

Trade name: Oxamyl 10% Granular
Registrant: Miller Chemical and Fertilizer Co.
EPA Reg. No.: 904-415
Crops protected: Pine, boxwood and many ornamentals
Formulation: 10% granular

Recommended Property Values for Oxamyl

Solubility in Water (mg/L): 282000

Field Half Life (days): 4

Soil Sorption Coefficient (ml/g): 25

Vapor Pressure (mm Hg): 2.3 x 10 -4

## OXYDEMETON-METHYL

Chemical name: Ethylsulfinyl)ethyl) 0,0-dimethyl phosphorothioate

Insects controlled: Mites, leafminers, elm leaf beetles, aphids, European Elm scales, chalcid wasps, cone moths, coneworms, phaloniid moths

Trade name: Metasystox-R 2
Registrant: Mobay Corporation
EPA Reg. No.: 3125-111
Crops protected: Ornamental trees
Formulation: 25% emulsifiable concentrate

Trade name: Metasystox-R Spray Concentrate
Registrant: Mobay Corporation
EPA Reg. No.: **SLN OR-800071** (Oregon only), Parent EPA Reg. No. 3125-111
Crops protected: Douglas-fir
Formulation: 25% emulsifiable concentrate

Trade name: Metasystox-R (Nursery Stock, Christmas Trees)
Registrant: Mobay Corporation
EPA Reg. No.: **SLN OR-890004** (Oregon only), Parent EPA Reg. No. 3125-111
Crops protected: Christmas trees, nursery stock (foliar treatment)
Formulation: 25% emulsifiable concentrate

Recommended Property Values for Oxydemeton-methyl

| | |
|---|---|
| Solubility in Water (mg/L): | 1000000 |
| Field Half Life (days): | 10 |
| Soil Sorptio Coefficient (ml/g): | 22 |
| Vapor Pressure (mm Hg): | 2.9 x 10 -5 |

## PERMETHRIN

| | |
|---|---|
| Chemical name: | Cyclopropanecarboxylic acid, 3-(2,2-dichloroethenyl) phenoxyphenyl methyl |
| Insects controlled: | Whiteflies, leafhoppers, caterpillars |

| | |
|---|---|
| Trade name: | Pounce 3.2 EC |
| Registrant: | FMC Corporation/Ag. Chemical Group |
| EPA Reg. No.: | 279-3014 |
| Crops protected: | Ornamentals |
| Formulation: | 38% emulsifiable concentrate |

| | |
|---|---|
| Trade name: | Pounce 25 WP |
| Registrant: | FMC Corporation/Ag. Chemical Group |
| EPA Reg. No.: | 279-3051 |
| Crops protected: | Nursery stock |
| Formulation: | 25% wettable powder |

Recommended Property Values for Permethrin

| | |
|---|---|
| Solubility in Water (mg/L): | 0.006 |
| Field Half Life (days): | 30 |
| Soil Sorption Coefficient (ml/g): | 100000 |
| Vapor Pressure (mm Hg): | 1.3 x 10 -8 |

# PROPARGITE

Chemical name: Butylphenoxy) cyclohexyl 2- propynyl sulfite

Insects controlled: Spider mites

Trade name: Omite CR
Registrant: Uniroyal Chemical Company, Inc.
EPA Reg. No.: 400-426
Crops protected: Conifers
Formulation: 30% wettable powder

Trade name: Omite 30WS
Registrant: Uniroyal Chemical Company, Inc.
EPA Reg. No.: 400-427
Crops protected: Conifers
Formulation: 30% wettable powder/dust

Recommended Property Values for Propargite

| | |
|---|---|
| Solubility in Water (mg/L): | 0.5 |
| Field Half Life (days): | 56 |
| Soil Sorption Coefficient (ml/g): | 4000 |
| Vapor Pressure (mm Hg): | 3 x 10 -3 |

# Chapter 5.

# SOIL FUMIGANTS

## CHLOROPICRIN

Chemical name: Trichloronitromethane

Pests controlled: Nematodes, Fungi, Weeds, Insects

Trade name: Chloropicrin
Registrant: Dow
Formulation: Used in mixtures with other fumigants for its biocidal properties and for its strong alarming odor

Recommended Property Values for Chloropicrin

| | |
|---|---|
| Solubility in Water (mg/L): | 2270 |
| Field Half Life (days): | 1 |
| Soil Sorption Coefficient (ml/g): | 62 |
| Vapor Pressure (mm Hg): | 18 |

## DAZOMET

Chemical name: Tetrahydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione

Pests controlled: Nematodes, Fungi, Weeds, Insects

Trade name: Basamid Granular
Registrant: Haco, Inc.
EPA Reg. No.: **SLN WA-870025 (Washington only)**, Parent EPA No. 2393-460
Crops protected: All stock
Formulation: 99% technical chemical

## General Information on Dazomet

| | |
|---|---|
| Solubility in Water: | > 100 ppm |
| Leaching Potential: | Negligible |
| Persistance in Soil: | Low, decomposes chemically |
| Volatility in Air: | > 1 mm Hg |
| Activity: | Dazomet is a fine crystalline solid that volatilizes after contacting soil moisture. The chemical breakdown products are the active fumigant gases: methyl isothiocyanate, formaldehyde, hydrogen sulfide, and monomethylamine. |

## DICHLOROPROPENE

| | |
|---|---|
| Chemical name: | Dichloropropene |
| Pests controlled: | Nematodes, Fungi, Weeds, Insects |

| | |
|---|---|
| Trade name: | Trical Telone II |
| Registrant: | Trical |
| EPA Reg. No.: | 11220-1 |
| Crops protected: | Forest trees |
| Formulation: | 92% solution-ready to use |

| | |
|---|---|
| Trade name: | Tri-Form 15 |
| Registrant: | Trical |
| EPA Reg. No.: | 11220-20 |
| Crops protected: | Forest trees |
| Formulation: | 79% Dichloropropene, 15% Chloropicrin; solution-ready to use |

| | |
|---|---|
| Trade name: | Tri-Form 30 |
| Registrant: | Trical |
| EPA Reg. No.: | 11220-21 |
| Crops protected: | Forest trees |
| Formulation: | 65% Dichloropropene, 29% Chloropicrin; pressurized gas |

| | |
|---|---|
| Trade name: | Western Farm Service Telone II |
| Registrant: | Western Farm Service, Inc. |
| EPA Reg. No.: | 11656-64 |
| Crops protected: | Forest trees |
| Formulation: | 92% solution-ready to use |

| | |
|---|---|
| Trade name: | Telone |
| Registrant: | Platte Chemical Co., Inc. |
| EPA Reg. No.: | 34704-476 |
| Crops protected: | Forest trees |
| Formulation: | 100% solution-ready to use |

| | |
|---|---|
| Trade name: | Telone C-17 |
| Registrant: | Dowelanco |
| EPA Reg. No.: | 62719-12 |
| Crops protected: | Forest trees |
| Formulation: | 74% Dichloropropene, 17% Chloropicrin; pressurized gas |

| | |
|---|---|
| Trade name: | Telone II |
| Registrant: | Dowelanco |
| EPA Reg. No.: | 62719-32 |
| Crops protected: | Forest trees |
| Formulation: | 94% pressurized gas |

| | |
|---|---|
| Trade name: | Vorlex |
| Registrant: | Nor-Am Chemical Co |
| EPA Reg. No.: | 45639-90 |
| Crops protected: | All stock |
| Formulation: | 40% Dichloropropene, 20% Methyl isothiocyanate; solution - ready to use |

Recommended Property Values for Dichloropropene

| | |
|---|---|
| Solubility in Water (mg/L): | 2250 |
| Field Half Life (days): | 10 |
| Soil Sorption Coefficient (ml/g): | 32 |
| Vapor Pressure (mm Hg): | 29 |

## METAM (METHAM) SODIUM

| | |
|---|---|
| Chemical name: | Sodium N-methyldithiocarbamate |
| Pests controlled: | Nematodes, Fungi, Weeds, Insects |

| | |
|---|---|
| Trade name: | Metam Soil Fumigant |
| Registrant: | Platte Chemical Co., Inc. |
| EPA Reg. No.: | 34704-647 |
| Crops protected: | Forest plantings ON FOREST SITE ONLY |
| Formulation: | 33% pressurized gas |

Recommended Property Values for Metham (Metam) Sodium Salt

| | |
|---|---|
| Solubility in Water (mg/L): | 963000 |
| Field of Half Life (days): | 7 |
| Soil Sorption Coefficient (ml/g): | 10 |
| Vapor Pressure (mm Hg): | 20 |

## METHYL BROMIDE

| | |
|---|---|
| Chemical name: | Methyl Bromide |
| Pests Controlled: | Nematodes, Fungi, Weeds, Insects |
| Trade name: | Bro-Mean C-33 |
| Registrant: | Reddick Fumigants |
| EPA Reg. No.: | 5785-24-37733 |
| Crops protected: | All stock |
| Formulation: | 67% methyl bromide; 33% chloropicrin; pressurized gas |
| Trade name: | Brom-O-Gas |
| Registrant: | Great Lakes Chemical Corp. |
| EPA Reg. No.: | 5785-4 |
| Crops protected: | Nonfood crops |
| Formulation: | 98% methyl bromide; 2% chloropicrin; pressurized gas |
| Trade name: | Brom-O-Gas |
| Registrant: | Great Lakes Chemical Corp. |
| EPA Reg. No.: | 5785-55 |
| Crops protected: | Nonfood crops |
| Formulation: | 99.75% methyl bromide |
| Trade name: | Dowfume MC-33 |
| Registrant: | Ethyl Corporation |
| EPA Reg. No.: | 3377-17 |
| Crops protected: | Forest trees |
| Formulation: | 66% Methyl Bromide, 33% Chloropicrin; solution-ready to use |
| Trade name: | Methyl Bromide 98% |
| Registrant: | Soil Chemicals Corporation Products |
| EPA Reg. No.: | 8536-19 |
| Crops protected: | Forest trees |
| Formulation: | 98% Methyl Bromide, 2% Chloropicrin; pressurized gas |

| | |
|---|---|
| Trade name: | MBC Soil Fumigant |
| Registrant: | Hendrix and Dail, Inc. |
| EPA Reg. No.: | 8853-1 |
| Crops protected: | Forest trees |
| Formulation: | 69% methyl bromide; pressurized gas |

| | |
|---|---|
| Trade name: | MBC Soil Fumigant Concentrate |
| Registrant: | Hendrix and Dail, Inc. |
| EPA Reg. No.: | 8853-2 |
| Crops protected: | Forest trees |
| Formulation: | 98% Methyl Bromide, 2% Chloropicrin; pressurized gas |

| | |
|---|---|
| Trade name: | MBC-33 Soil Fumigant |
| Registrant: | Hendrix and Dail, Inc. |
| EPA Reg. No.: | 8853-3 |
| Crops protected: | Forest trees |
| Formulation: | 67% Methyl Bromide, 33% Chloropicrin; solution - ready to use |

| | |
|---|---|
| Trade name: | Trical Methyl Bromide 99.5% |
| Registrant: | Trical Inc. |
| EPA Reg. No.: | 8536-12-11220 |
| Crops protected: | Fruit trees and ornamentals |
| Formulation: | 99.5% pressurized gas |

| | |
|---|---|
| Trade name: | Terr-O-Gas 57 |
| Registrant: | Great Lakes Chemical Corp. |
| EPA Reg. No.: | 5785-28 |
| Crops protected: | All stock |
| Formulation: | 57% methyl bromide; 43% chloropicrin; pressurized gas |

| | |
|---|---|
| Trade name: | Terr-O-Gas 67 |
| Registrant: | Great Lakes Chemical Corp. |
| EPA Reg. No.: | 5785-24 |
| Crops protected: | All stock |
| Formulation: | 67% methyl bromide; 33% chloropicrin; pressurized gas |

## Recommended Property Values for Methyl Bromide

| | |
|---|---|
| Solubility in Water (mg/L): | 13400 |
| Field Half Life (days): | 55 |
| Soil Sorption Coefficient (ml/g): | 22 |
| Vapor Pressure (mm Hg): | 1824 |

# METHYL ISOTHIOCYANATE

| | |
|---|---|
| Chemical name: | Isothiocyanatomethane |
| Pests controlled: | Nematodes, weeds, insects, fungi |
| Trade name: | Vorlex |
| Registrant: | Nor-Am Chemical Co. |
| EPA Reg. No.: | 45639-90 |
| Crops protected: | All stock |
| Formulation: | 40% dichloropropene, 20% methyl isothiocyanate; solution - ready to use |

Recommended Property Values for Methyl Isothiocyanate

| | |
|---|---|
| Solubility in Water (mg/L): | 7600 |
| Field Half Life (days): | 10 |
| Soil Sorption Coefficient (ml/g): | 10 |
| Vapor Pressure (mm Hg): | 20 |

# Chapter 6.

## SURFACE TREATMENTS

### AGRIBROM

| | |
|---|---|
| Chemical name: | Bromo-3-chloro-5,5-dimethylhydantoin |
| Pests controlled: | Algae and other microorganisms |
| Trade name: | Agribrom Granules |
| Registrant: | Great Lakes Chem Corp. |
| EPA Reg. No.: | **SLN CA-900033** (California only); Parent EPA No. 5785-70 |
| Uses: | Greenhouse walks, greenhouse (outdoors) |
| Formulation: | 94% granular |

### Copper Naphthenate

| | |
|---|---|
| Chemical name: | Copper naphthenate |
| Pests controlled: | Blue stain and decay fungi, termites, powderpost beetles |
| Trade name: | DAP Below Ground Wood Preservative |
| Registrant: | DAP Inc. |
| EPA Reg. No.: | 1022-518-1409 |
| Uses: | Wood trays (nonfumigation treatment) |
| Formulation: | 9% solution--ready to use |
| Trade name: | Redy Coat Green Gard |
| Registrant: | Gilsonite, Inc. |
| EPA Reg. No.: | 5831-6 |
| Uses: | Wood trays |
| Formulation: | 20% Copper naphthenate, 80% mineral spirits; impregnated materials |

## Green-shield

| | |
|---|---|
| Chemical name: | Alkyl dimethyl benzyl (and ethylbenzyl) ammonium chlorides |
| Pests controlled: | Algae, Bacteria, Fungi |
| Trade name: | PT 2000 Green-shield |
| Registrant: | Whitmire Research Laboratories |
| EPA Reg. No.: | 53642-2-499 |
| Uses: | Wood boxes (nonfumigation treatment) |
| Formulation: | 10% benzyl plus 10% ethylbenzyl; soluble concentrate |

## Zinc Naphthenate

| | |
|---|---|
| Chemical name: | Zinc naphthenate |
| Pests Controlled: | Mold, mildew, stain and decay fungi, termites |
| Trade name: | M-Gard S552 |
| Registrant: | Mooney Chemicals, Inc. |
| EPA Reg. No.: | 9630-21 |
| Uses: | Lumber (non-fumigation treatment) |
| Formulation: | 63% soluble concentrate |
| Trade name: | TRC Water Repellent Wood Preserver |
| Registrant: | Texas Refinery Corp. |
| EPA Reg. No.: | 9630-16-3215 |
| Uses: | Lumber (non-fumigation treatment) |
| Formulation: | 16% solution - ready to use |
| Trade name: | Sunnyside Wood Preservative |
| Registrant: | Sunnyside Corp |
| EPA Reg. No.: | 9630-18-7135 |
| Uses: | Lumber (non-fumigation treatment) |
| Formulation: | 16% solution - ready to use |
| Trade name: | W/B Zinc Treat 2% |
| Registrant: | Willard Products |
| EPA Reg. No.: | 9630-18-9639 |
| Uses: | Lumber (non-fumigation treatment) |
| Formulation: | 16% solution - ready to use |

## LIST OF REGISTRANTS

Abbott Laboratories
Chemical and Agricultural Products
1400 Sheridan Road
North Chicago, IL 60064

Agway, Inc.

Amvac Chemical Corporation
4100 E. Washington Blvd.
Los Angeles, CA 90023

Bonide Products, Inc.
2 Wurz Avenue
Yorkville, NY 13495

Chevron Chemical Company
Registration and Regulatory Affairs Dept.
940 Hensley Street
Richmond, CA 94804

Ciba-Geigy Corporation
Agricultural Division
P.O. Box 18300
Greensboro, NC 27419

Cooke Laboratory Products
7737 N.E. Killingsworth Avenue
Portland, OR 97218

DAP, Inc.
P.O. Box 277
Dayton, OH 45401

DowElanco
Quad IV 9002 Purdue Road
Indianapolis, IN 46268-1189

Drexel Chemical Company
Box 9306
Memphis, TN 38109

Duphar Crop Protection, Inc.
C.J. Van Houtenlaan
36-1381 CP WEESP
The Netherlands

E.I. DuPont de Nemours and Company, Inc.
Agricultural Products BMP-6155
Box 80038
Wilmington, DE 19880

E.I. DuPont
Agricultural Products BMP-6176
P.O. Box 80038
Wilmington, DE 19880-003

Ethyl Corporation
451 Florida Street
Baton Rouge, LA 70801

FMC Corporation
ACG Specialty Products
1735 Market Street
Philadelphia, PA 19103

FMC Corporation/Agriculture Chemical Group
2000 Market Street, Room 2255
Philadelphia, PA 19103

Ford's Chemical and Service
3741 Red Bluff, Suite 100
Pasadena, TX 77503

Gilsonite, Inc.
P.O. Box 11242
Portland, OR 97211

Gold Kist, Inc.
P.O. 2210
Atlanta, Ga 30301

Gowan Company
P.O. Box 5569
Yuma, AZ 85366

Grace/Sierra Crop Protection Company
1001 Yosemite Drive
Milpitas, CA 95035

Great Lakes Chemical Corporation
P.O. Box 2000
West Lafayette, IN 47906

Griffin Corporation
P.O. Box 1847
Valdosta, GA 31601-1847

Gustafson, Inc.
P.O. Box 660065
Dallas, TX 75266-0065

Haco, Inc.
P.O. Box 7190
Madison, WI 53707

Harrell's, Inc.
Box 807
Lakeland, FL 33802

Helena Chemical Company
5100 Poplar Avenue #3200
Memphis, TN 38137

Hendrix and Dail, Inc.
Box 648
Greenville, NC 27835

Howard Fertilizer Company, Inc.
Box 593800
Orlando, FL 32859-3800

ICI Americas, Inc.
Agricultural Products
1200 South 47th Street
Richmond, CA 94804

Intagra, Inc.
8500 Pillsbury Ave. South
Minneapolis, MN 55420

ISK Biotech Corporation
5966 Heisley Road, Box 8000
Mentor, OH 44061-8000

J.R. Simplot Company
Box 198
Lathorpe, CA 95330

Lebanon Chemical Corporation
P.O. Box 180
Lebonan, PA 17042

Miller Chemical and Fertilizer Company
P.O. Box 333
Hanover, PA 17331

Miles, Inc.
Box 390
Shawnee Mission, KS 66201

Mobay Corporation
Agricultural Chemical Division
P.O. Box 4913
Kansas City, MO 64120

Monsanto Company
700 14th Street, N.W. Suite 1100
Washington, D.C. 20005

Mooney Chemicals, Inc.
2301 Scranton Road
Cleveland, OH 44113

Nor-Am Chemical Company
3509 Silverside Road
P.O. Box 7495
Wilmington, DE 19803

Occidental Chemical Corporation
Development Center, V-81 Box 344
Niagara Falls, NY 14302

Oxon Italia S.P.A.
Strada Semptone 21-20016
Pero, Milan, Italy IT 00000

PBI/Gordon Corporation
1217 West 12th Street Box 4090
Kansas City, MO 64101

Platte Chemical Company
150 South Main Street
Fremont, NE 68025

Platte Chemical Company
P.O. Box 667
Greeley, CO 80632

Reddick Fumigants
P.O. Box 391
Williamston, NC 27892

Rhone-Poulenc Agricultural Company
2 T.W. Alexander Drive
P.O. Box 12014
Research Triangle Park, NC 27709

Riverside/Terra Corporation
Box 171376
Memphis, TN 38187-1376

Rockland Corporation
686 Passaic Avenue, Box 809
West Calwell, NJ 07007

Rohm and Haas Company
Agricultural Chemicals
Independence Mall West
Philadelphia, PA 19105

Soil Chemical Corporation Products
D/B/A SCC Products and Soil Chemicals Company
Box 782
Hollister, CA 95024

Sostram Corporation
Rt. 1, Box 143-A
Lakeland, GA 31635

Southern Mill Creek Products
5414 North 56th Street
Tampa, FL 33610

Sunnyside Corporation
225 Carpenter Avenue
Wheeling, IL 60090

Tennessee Chemical Company
3400 Peach Tree Road N.E., Suite 401
Atlanta, GA 30326

Texas Refinery Corporation
One Refinery Place
Fort Worth, TX 76101

Trical, Inc.
Box 1327
Hollister, CA 95024

UCB Chemicals Corporation
5505-A Robin Hood Road
Norfolk, VA 23513

Uniroyal Chemical Company, Inc.
74 Amity Road
Bethany, CT 06524-3402

Upjohn Company
7000 Portage Road
Kalamazoo, MI 49001

Valent U.S.A. Corporation
1333 North California Boulevard Box 8025
Walnut Creek, CA 94596

Veterans-Ilex, Inc.
633 Third Avenue
New York, NY 10017

Western Farm Service, Inc.
Box 1168
Fresno, CA 93715

Whitmire Research Laboratories, Inc.
3568 Tree Court Ind. Blvd.
St. Louis, MO 63122

Willard Products
P.O. Box 249
Redwood City, CA 94064

## GLOSSARY OF TRADE NAMES

*Trade name* = Product not found as registered for tree nurseries

### ANIMAL REPELLENTS

Deer Away Big Game Repellent = putrescent egg solids
MGK Big Game Repellent = putrescent egg solids
Pratt Animal Repellent = tetramethyl thiuram disulfide
Science Rabbit and Deer Repellent = tetramethyl thiuram disulfide

### FUNGICIDES

Aliette = fosetyl-aluminum
*Apron*= metalaxyl
Banner = propiconazole
*Banol*= propamocarb hydrochloride
*Banrot*= thiophanate methyl and etridiazole
Bayleton = triadimefon
Benlate = benomyl
Bonide Turf, Garden & Ornamental Fungicide = chlorothalonil
*Botec*= captan with DCNA
Botran = Dicloran (DCNA)
Bravo = chlorothalonil
Captan
*Captanex*= captan
Carbamate = ferbam
Champ = chlorothalonil
Chipco Aliette = fosetyl-aluminum
Chlorothalonil
Cooke Sulf-R-Spray = lime sulfur
Daconil = chlorothalonil
Dithane = mancozeb
Duosan = mancozeb and thiophanate methyl
Evade = chlorothalonil
*Fungo*= thiophanate methyl
Gustafson 42-S = thiram
*Iprodione*
Karathane = dinocap
Mancozeb
*Maneb*
Manex = mancozeb
Manzate = mancozeb
*Orbit*= propiconazole
*Orthocide*= captan
*Ridomil*= metalaxyl
Subdue = metalaxyl
*Tersan*= benomyl
Tennessee Brand Tri-Basic Coppersulfate = Bordeaux mixture
*Tilt*= propiconazole
*Topsin*= thiophanate methyl

Truban = etridiazole
*Vinclozolin*
Ziram
Zyban = mancozeb and thiophanate methyl

HERBICIDES

Casoron G-4 Herbicide = dichlobenil
Cobra Herbicide = lactofen
Dacthal = DCPA
Devrinol = napropamide
*Dicamba*
Dichlobenil
*Diphenamid*
Drexel EPTC-7EC = EPTC
Eptam = EPTC
EPTC
*Fosamine ammonium*
Fusilade = fluazifop-p-butyl
Genep EPTC 7EC = EPTC
Goal 1.6E Herbicide = oxyfluorfen
Gold Kist 5-5-25 with Ronstar
Harrell's Ronstar 1.5 with Fertilizer = oxadiazon
Kerb 50-W in W.S.P. = pronamide
Lebanon Country Club 19-4-9 with Ronstar = oxadiazon
Modown = bifenox (mostly cancelled)
*Oust*= sulfometuron methyl
Pennant = metolachlor
Princep = simazine
Roundup = glyphosate
Simazine
Sim-Trol 9DF = simazine
*Spike* = tebuthiuron
Surflan A.S. = oryzalin
Touchdown = sulfosate
*Triclopyr*
Turf Supreme plus Ronstar = oxadiazon
Turf Pride with Ronstar = oxadiazon
*Velpar* = hexazinone

INSECTICIDES

Asana = esfenvalerate
Azinphos-M = azinphos-methyl
*Baythroid* = cyfluthrin
*Bifenthrin*
Carbaryl
Clean Crop Endocide 3E.C. = endosulfan
Clean Crop Sniper 2-E = azinphos-methyl
Cooke Sulf-R-Spray = calcium polysulfide

*Trade name* = not registered

Cythion = malathion
Diazinon
Dimethoate
Dimilin = diflubenzuron
Dipel = Bt, Bacillus thuringiensis
Dursban = chlorpyrifos
Get-A-Bug Snail, Slug and Insect Killer = carbaryl
*Gnatrol* = Bt, Bacillus thuringiensis
Guthion = azinphos-methyl
Karathane = dinocap
Kelthane = dicofol
Knox Out PT 1500R = diazinon
Krovar = esfenvalerate
Lannate = methomyl
Lindane
*Lorsban* = chlorpyrifos
Metaldehyde
Metasystox-R = oxydemeton-methyl
Methiocarb
*Mesurol* = methiocarb
Nemacur = fenamiphos
Oftanol = isofenphos
Omite = propargite
Orthene = acephate
Ortho Isotox Insect Spray = carbaryl
Oxamyl
Pounce = permethrin
Pydrin = fenvalerate
Sevin = carbaryl
Sumithrin = D-phenothrin
Supracide = methidathion
Thiodan = endosulfan
Vectobac-12 AS = Bt, Bacillus thuringiensis
Vendex = fenbutatin-oxide
Vydate = oxamyl

SOIL FUMIGANTS

Basamid = dazomet
Bro-Mean C-33 = methyl bromide and chloropicrin
Brom-O-Gas = methyl bromide and chloropicrin
Dowfume MC-33 = methyl bromide and chloropicrin
MBC Soil Fumigant = methyl bromide and chloropicrin
Metam Soil Fumigant = metam sodium; for forest planting sites only
Methyl Bromide
Telone = dichloropropene
Terr-O-Gas = methyl bromide and chloropicrin
Tri-Form = dichloropropene
*Vapam* = metam sodium
Vorlex = dichloropropene and methyl isothiocyanate

*Trade name* = not registered

SURFACE TREATMENTS

Agribrom
DAP Below Ground Wood Preservative = copper naphthenate
Greenshield
M-Gard S552 = zinc naphthenate
Redy Coat Green Gard = copper naphthenate
Sunnyside Wood Preservative = zinc naphthenate
TRC Water Repellent Wood Preserver = zinc naphthenate
W/B Zinc Treat = zinc naphthenate